THE AUTOMOBILE

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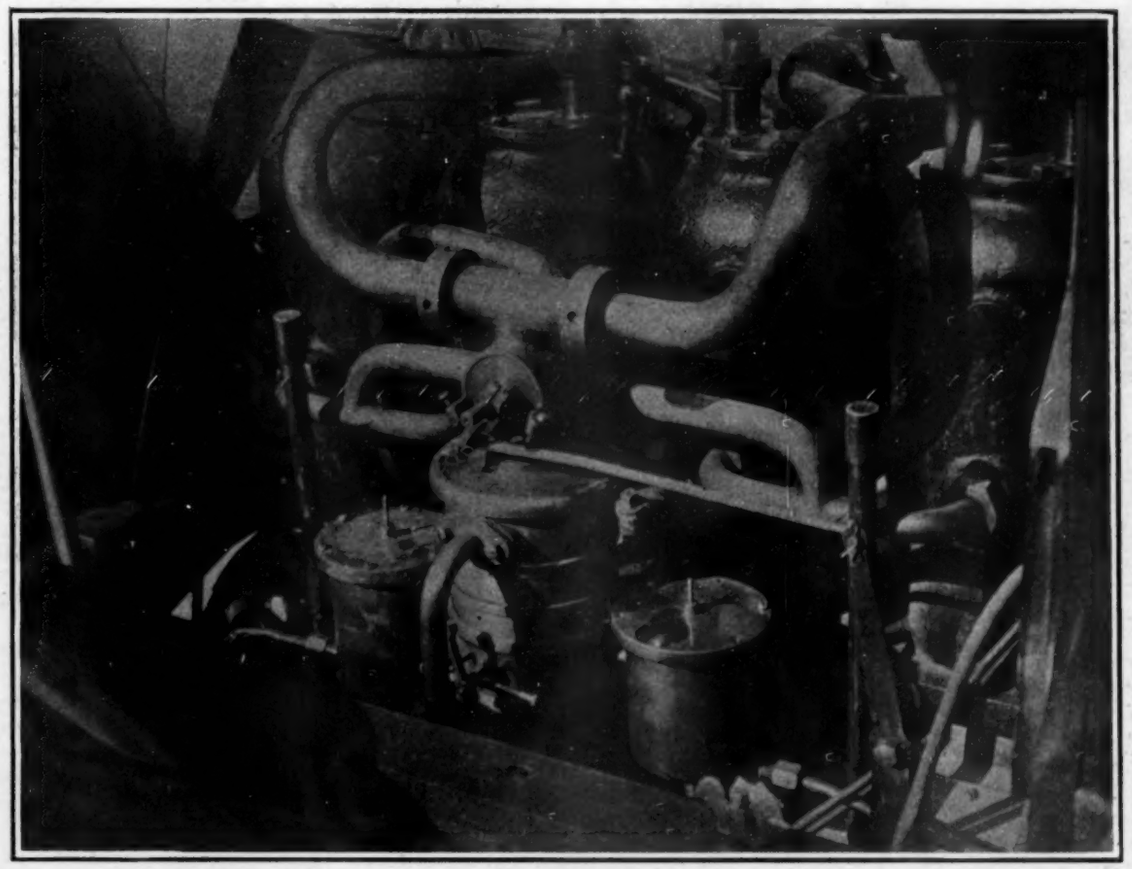
CAR USING KEROSENE OIL AS FUEL.

FOR several years a New York automobile builder has been conducting a series of experiments, with a view to producing a carbureter that would enable an ordinary explosion motor to run successfully on either gasoline or kerosene. The device constructed on the basis of the data gained experimentally has been attached to a 30-horsepower automobile, of the ordinary gasoline type, which is now in everyday use in and about New York city. At the same time the tire problem was attacked, the object being to devise a suspension that, used with solid rubber tires, would give as easy riding to the occupants of the car as pneumatic tires. The result was an air-cushion which was interposed between the axle and the spring at the point where the spring is usually bolted on. With the exception of the kerosene carbureter, the pneumatic cushions and the solid rubber tires, the car is a typical gasoline car of good design and workmanship; it was originally built as a gasoline car and intended to run on pneumatic tires; and it was used for some time with gasoline for the motor and pneumatic tires on the wheels, with springs attached in the ordinary way, until the progress of the experiments made it necessary to place the devices in actual service on a car. The carbureter and air cushion were designed by W. I. Twombly, of the Twombly Power Co., Twelfth avenue and Fifty-first street, New York, and were attached to a car of his own construction.



[SIDE OF THE MOTOR SHOWING CARBURETER AND CONNECTIONS WITH GASOLINE AND KEROSENE FLOAT CHAMBERS.

Apart from the carbureter and air cushions there is nothing unusual about the car. The 30-horsepower motor is of the four-cylinder vertical type, water-cooled, with integral heads and jackets and automatic inlet valves; the speed of the motor is at all times under the control of a cen-

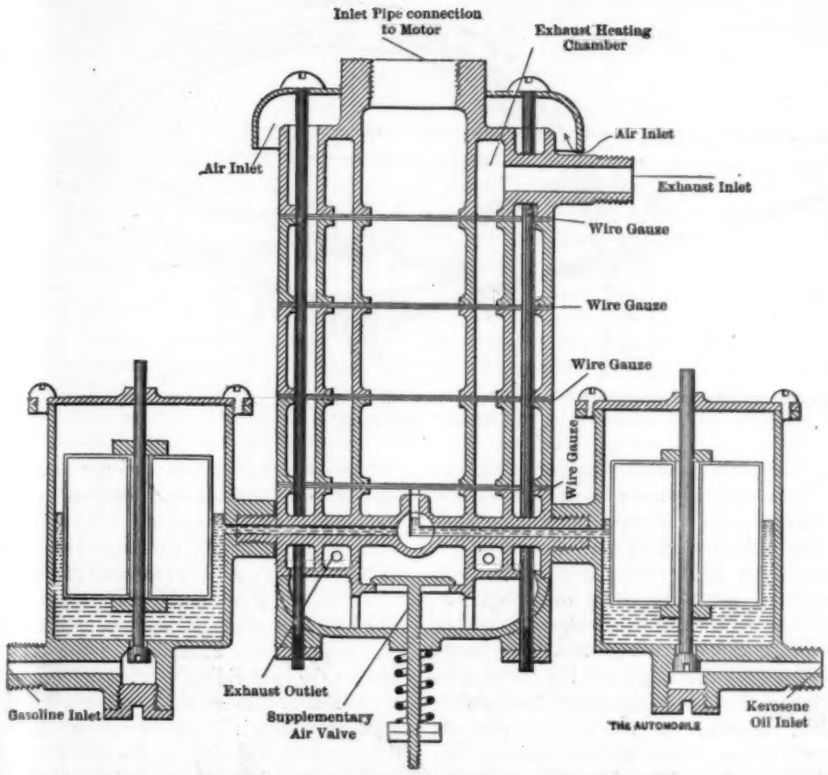
trifugal governor working on the throttle, which is placed in the supply pipe close to the carbureter. Lubrication is by splash; ignition is by jump spark, with quadruple vibrator coil on the dash. The rear wheels are driven by side chains; a leather-faced cone clutch and sliding gear transmission are used. The side entrance body is of good size and is carried on semielliptic springs, each spring being shackled at one end and pivoted at the other. Distance rods on the rear axles transmit the driving stresses to the body of the car. A large cylindrical kerosene tank is hung at the rear of the body, exhaust pressure being used to raise the oil to the carbureter. A gasoline tank is placed under the seat and a three-way cock fitted so that either fuel can be used.

In order to make a test of the carbureter and pneumatic cushions under actual working conditions, a trip was made in the car by a representative of THE AUTOMOBILE and these parts closely watched. The motor was started on kerosene without cranking, by switching on the ignition current, after having stood for about ten minutes. The exhaust gases escaped from the muffler in an invisible state, and no odor was perceptible when standing close enough to feel the hot gases; the exhaust remained invisible and odorless throughout the trip. A stop was made at one point and the condition of the exhaust investigated as thoroughly as was possible at the time. A sheet of clean paper was held within three or four inches of the exhaust pipe, so that the escaping gases impinged directly on the paper; no deposit of any kind was made, the paper remaining perfectly clean and unstained after having been repeatedly held in the path of the exhaust gases. The representative of THE AUTOMOBILE held his face as close to the exhaust pipe as could be done without discomfort from the force of the blast and remained in that position for several minutes. Under these conditions there was a barely perceptible odor, resembling that emitted by an ordinary gas stove, only much less pronounced. There was no irritation of the eyes or of the sensitive membranes of the nostrils; the blast of the exhaust had about the same effect as so much hot air blown in the face. The connections were then changed by means of the three-way cock so that the carbureter took gasoline instead of kerosene. The speed of the engine did not vary perceptibly and there was no difference in its running. No explosions were missed, either during this test or during the run on the road, and the motor ran as well with one fuel as with the other. After allowing the engine to run for a few minutes to use up the small quantity of kerosene remaining in the carbureter passages, the tests at the mouth of the exhaust pipe were repeated, with the same results as when kerosene was used. Clean paper was not soiled and there was the same absence of odor and smoke. The three-way cock was set in mid position, so that the carbureter received a mixture of gasoline and kerosene; and the valve was jerked back and forth from one fuel to the other, all without disturbing the steady running of the engine or making the exhaust any less clean.

During the run the car took the steepest grades in Central Park and Riverside Drive on the high gear, the engine pulling as strongly and running as smoothly as on previous trip when only gasoline was used. In fact, the engine ran faultlessly at all times, even when throttled down to a crawl.

The other novel feature of the car, the pneumatic cushions, whose general appearance and location are shown in the engravings, could be watched from both front seat and tonneau and their action under varying road conditions noted. Most important, however, was the effect produced on the riding qualities of the car; and this was interesting. On ordinarily good roads the car was quite as comfortable as if equipped with pneumatic tires; it was noticed that the vibration did not increase as the speed of the car increased, however, and on passing over bumps or ruts there was a marked absence of any tendency to toss the passengers about in the seats, this being especially noticeable in the tonneau, which is usually a very lively place in a car of short wheelbase when the road is rough. Car tracks and other obstructions of a nature to give the occupants of the car a sharp, quick jolt were passed over smoothly and easily, with little lift of the car body and practically no jolting. Under certain conditions, such as when passing rapidly over cobblestones or a very rough road surface, a slight "hardness" was apparent. At no time was there any sensation as of riding on solid tires, however, and there was a peculiar softness in the suspension, doubtless due to the fact that the connecting

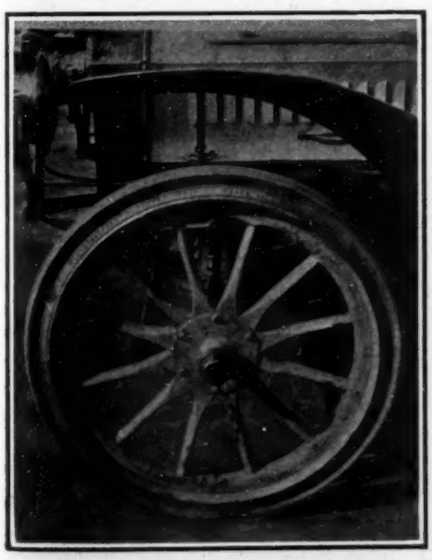
EXPERIMENTAL CAR USING KEROSENE AS FUEL AND FITTED WITH PNEUMATIC SUSPENSIONS—W. I. TWOMBLY AT THE WHEEL.



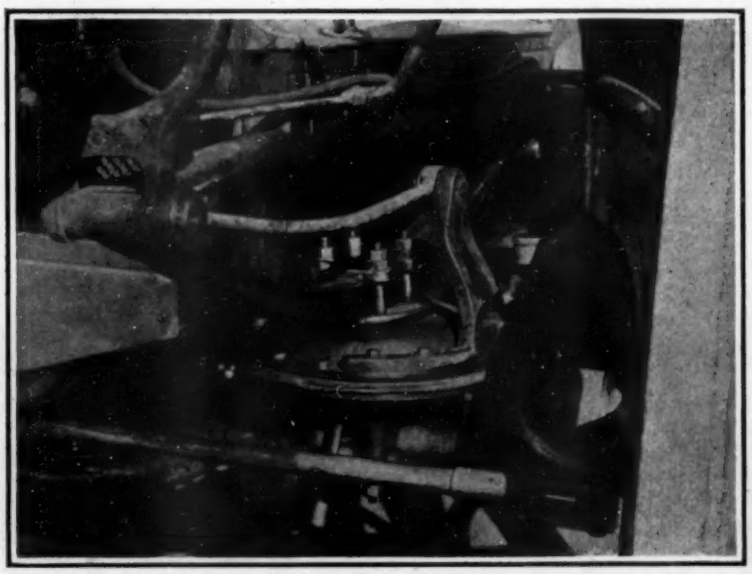
VERTICAL SECTION OF THE CARBURETER SHOWING FLOAT CHAMBERS AND MIXING CHAMBER.

medium between the springs and axles is elastic. The hardness mentioned is probably due to the fact that the springs, especially in the rear, are rather stiff, and the wheels are of small diameter for the car. The wheelbase is short and no attempt had been made to adapt the car to the new suspension. It seems likely that with a longer wheelbase, larger wheels, and springs adapted for use with the pneumatic cushions, the car will ride at least as comfortably as a well-hung car with pneumatic tires. Another point to be noted is that the experimental cushions used were restricted as to size by the space available for them. In a specially designed car the cushions will be considerably larger and better adapted to absorb vibration.

Both these devices are simple and substantial in construction and there is no apparent reason why they should not give long service under all conditions of road work. The carbureter, illustrated by a line engraving and an exterior view, has two float chambers, one for gasoline and one for kerosene, each connected with the spray nozzle by a passage. At the junction of these passages with the spray nozzle inlet there is a three-way cock; this is shown in the engraving set to deliver kerosene. A little lever for moving this cock may be seen in the engraving showing the exterior of the carbureter; the set screws for limiting the motion of the lever and so regulating the amount of opening allowed may also be seen. An eye is provided in the lever so that a rod may be connected for operation from the dashboard, but this was not attached when the photograph was taken. The float chambers construction requires no explanation, the drawing showing the arrangement plainly. The central section of the carbureter, however, is unusual. It was found by experiment that kerosene, heated to about 140 degrees Fahr., is about as volatile as gasoline at ordinary temperatures; but the air mixed with the kerosene vapor must be at least as hot as the vapor; if not, condensation will occur and the mixture will burn with the familiar smoke and smell; therefore the oil and air must both be heated before they are brought together and must be kept hot. It was also found that some mechanical means for breaking up the particles of kerosene was essential; kerosene showed a strong cohesive tendency not apparent in gasoline. The first requirement, the heating of the air and oil and the final mixture, is accomplished by filling an annular chamber in the carbureter with hot gases from the exhaust. This compartment is concentric with and just outside of the central mixing chamber. The hot gases enter through the inlet shown on the right-hand side, near the top, fill the chamber, pass downward, surrounding the fuel passages, and escape through the small openings shown near the bottom. The whole carbureter is thus kept hot and considerable heat is taken up by the horizontal layers of fine wire gauze, to be utilized, as will appear later. All the air used is admitted under the hood which forms the top of the mixing chamber; there is no other air inlet.



PNEUMATIC SUSPENSION SEEN FROM OUTSIDE WHEEL.

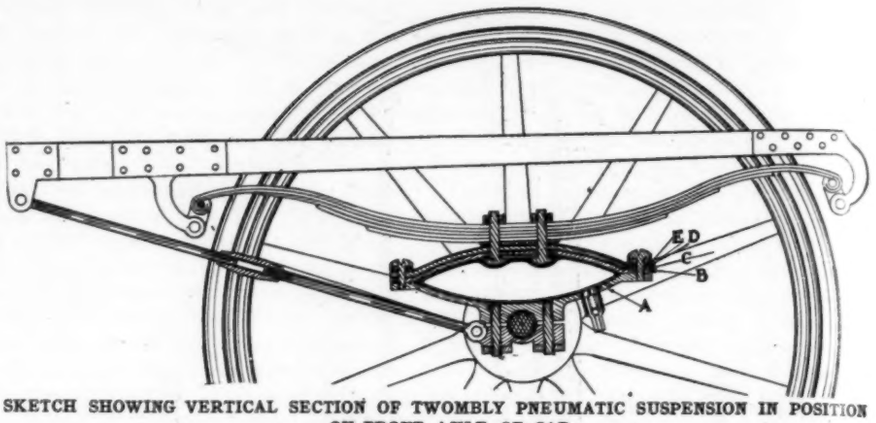


GENERAL ARRANGEMENT OF THE TWOMBLY PNEUMATIC SUSPENSION.

Passing through a narrow space, the air is brought in contact with the hot walls of the heating chamber, and also passes through four successive layers of gauze, from which it takes up additional heat. The hot air now passes into the chamber at the bottom of the carbureter, below the auxiliary air valve, and when it arrives at the spray nozzle is at about the same temperature as the kerosene. At slow speeds the auxiliary air valve remains seated, the air drawn through the small passages shown being sufficient; but the valve lifts as the demands of the motor increase, the action being similar to that of the auxiliary air valves used on many gasoline carbureters. On leaving the nozzle the spray immediately strikes the first gauze diaphragm, which commences the work of dividing the particles of kerosene. There are four of these diaphragms, each consisting of several layers of gauze, and each does its share toward the breaking up of the fuel. The heat taken up by the gauze tends to increase the temperature of the mixture, and so condensation during the mixing and dividing process is avoided. The mixture is carried out through the central outlet at the top of the mixing chamber and is piped to the engine, the pipes being close to the cylinders to avoid cooling. A throttle, shown clearly in the photograph, is placed immediately over the opening and is of ordinary construction.

The carbureter is made in five sections held together by the long bolts shown; the divisions occur where the gauze diaphragms are inserted, the gauze being clamped between the sections. A cock is placed in the pipe leading in the exhaust gases, so that the pipe can be throttled when gasoline is used and less heat is required. Though not so shown in the diagram, the three-way cock is so made that when set in mid position it will take gasoline and kerosene in approximately equal parts.

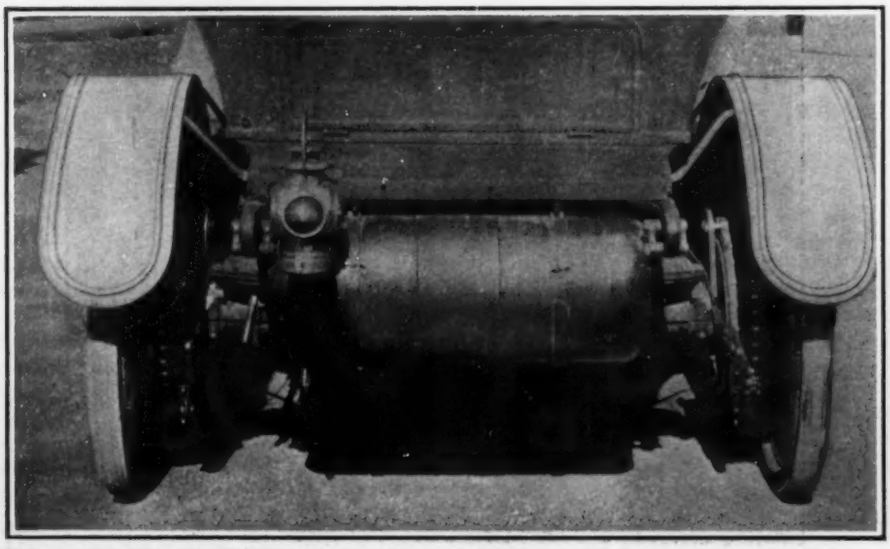
The pneumatic cushion is even more simple and easily described; the engravings



SKETCH SHOWING VERTICAL SECTION OF TWOMBLY PNEUMATIC SUSPENSION IN POSITION ON FRONT AXLE OF CAR.

show the parts plainly. The foundation of the cushion is a saucer-shaped gun metal casting, on the bottom of which are lugs for the bolts by which the cushion is attached to the axle. The top of the cushion consists of an outer cover of heavy pigskin over an intermediate layer of rubber and fabric vulcanized together. An "inner bag" occupies the same relative position as the inner tube of a pneumatic tire, and is inflated through a valve that projects through a hole in the bottom casting. The pigskin and the rubber fabric are held between two plates, the spring being secured to the upper plate by four bolts which pass through and hold both plates at the same time; the inner rubber bag is of course free. The thickness of the whole top of the cushion is about five-eighths of an inch; the edges of the discs are clamped between the flange of the saucer-shaped casting and a ring, closely spaced bolts holding down the ring. Attached to the casting of each front cushion is a bracket carrying one end of a torsion rod, the other end being pivoted to the front spring hanger. The front axle is kept parallel with the rear axle by distance rods secured to the frame. The rear axles are also fitted with truss rods in the usual way.

The cushions now on the car have been used in runs aggregating between 700 and 800 miles, and show no signs of deterioration. They are out of the way of accidental injury and are subjected to none of the wear and tear that pneumatic tires get from contact with the road. A point that has its effect both on the durability of the cushion and on the easy riding of the car is that it is not necessary to pump the cushions to a high pressure; it is only necessary to keep the car from bumping on the axles, and the pressure is only that required by the weight of the car. In the case of the experimental cushions this is about 25 pounds to the square inch. The next set will be made much larger—probably 16 inches in diameter. Both devices will be seen at the forthcoming automobile show in the Sixty-ninth Regiment armory, New York.



REAR VIEW OF CAR SHOWING PNEUMATIC SUSPENSIONS FITTED TO BACK AXLE.

A competition for acetylene headlights and searchlights was promoted some time ago by leading German motoring and industrial corporations in order to assist the development of reliable and safe lamps for automobile purposes. The list of awards published recently shows that twenty-six lamps with generators, seventeen searchlights and fourteen generators were entered for the contest. The lamps were all put to practical test, as they were handed over to the German Motor Volunteer Corps and were used for some time, as well as being carefully examined in the laboratory. The chief points were construction, weight, power of light, consumption of carbide and time of burning, and awards were made as follows: Class A, lamps with generators, no first prize; second prizes to the Westphalian Metal Industry, Ltd., Lippstadt, and J. Schwárz, Berlin. Class B, searchlights without generators, first prize, A. Boas, Roderigues & Co., Paris; second prize, Westphalian Metal Industry, Ltd.; third prize, Oberrheinische Metal Works, Ltd., Mannheim. Class C, generators only, first prize, E. J. Arnold, Successor, Dresden,

It has been estimated that the maximum temperature at the hottest part of an exploding mixture in a gasoline engine cylinder is about 4,000 degrees Fahr.

Automobile Laws of England.

From Our Own Correspondent.

LIVERPOOL, Oct. 27.—Although self-propelled carriages for use on the public highways were introduced first in England, it was not until 1896 that automobiles were allowed to run freely in England, adverse laws passed many decades earlier having been enforced without modification to meet the new development. This situation allowed France to gain a lead in the automobile industry that even now, after a lapse of nearly ten years, is very largely maintained. Before 1896 all mechanical vehicles, small or large, were classed as "traction engines" and had to be preceded on the road by a man on foot carrying a red flag. The maximum speed allowed was four miles an hour.

Now that the recently appointed royal commission is sitting to consider carefully the question of the rights and duties of automobile users, and that the future of the industry and pastime will depend largely upon the results of the commission's deliberations, a brief account of the various changes that have been made in the law affecting automobiles should be of interest.

Locomotives on Highways Act.

The absurd restrictions of the old locomotives act were abolished by the Locomotives on Highways Act passed nine years ago, which permitted a maximum speed of fourteen miles an hour, but this limit was reduced to twelve miles by the local government board in accordance with the power given to it by the act. The use of motor vehicles for commercial purposes was greatly hampered by the imposition of many restrictions as to weight, maximum width, load per wheel, etc., but of late years many changes have been made in the law, so that now these commercial cars are used probably to a much larger extent over here than in any other country. The twelve-mile-an-hour limit was too low even for the most considerate driver and, except in cities, the law was practically a dead letter for some years until the reckless speed of many drivers, particularly those of high-powered cars, caused an outbreak of public feeling against the new form of locomotion. Immediately followed the obnoxious "police traps," with careless timing of cars over ridiculously short distances—generally measured out on deserted roads, where high speeds would cause no public danger—and a spirit of antagonism was raised between automobilists and the police which has lasted to the present day. Particularly in the south of England did this police activity manifest itself; in the north and in Ireland and Scotland more friendly relations were maintained.

Motor Car Act of 1903.

Two years ago the Automobile Club of Great Britain and Ireland started an agitation for a law that should provide for the identification of automobiles and that would grant in return the privilege of higher speed. After some discussion in Parliament—where the blind, unreasoning attitude of the horse interest was very marked—the Motor Car Act came into force in January, 1904. While granting the right of speeding up to twenty miles an hour, the act created about thirty new offences, with penalties of $10 to $250, or imprisonment in aggravated cases.

The act provides for the issuing of identification numbers for all cars, and these are allotted by the various city and county authorities, each licensing authority having a distinguishing letter. The letter and numbers must be visible from the front and back of the car, and provision must be made for their illumination at night.

Every person driving an automobile, even on a trial trip, must carry with him his driving license, but as no examination is made of the driver's skill or capabilities, it is somewhat difficult to see the use or necessity of the license, except as a means of checking the address given by a chauffeur if stopped by the police—a license has actually been taken out for a blind man. It is somewhat of a hardship to have to carry the license always when driving, and a chance moment of forgetfulness may lead to a $25 fine. As an evidence of how strict the police are in carrying out the letter of the law, there are at least two cases on record in which automobilists have been heavily fined for not producing their licenses, when, as a matter of fact, the licenses were at the time in the custody of the licensing authority for their annual renewal.

Driving License and Registration.

An annual fee of $1.25 must be paid for the driving license, and the charge for the allotment of identification numbers for automobiles is $5 and for motorcycles $1.25. These numbers do not need to be renewed until a change in ownership of the machine is made. It is estimated that the fees paid in the twenty-one months since the act went into force aggregate about $400,000. In addition, nearly $600,000 is paid annually by automobile owners to the inland revenue authorities as carriage taxes. Yet, in spite of this, the public, at the instigation of the halfpenny "yellow press," cries, "Tax the motorist."

For all this outlay the automobilist gets in return—nothing. As a matter of fact, the act provided that caution signs should be erected by the local authorities at dangerous corners and crossings, but very little of this has been done, and in any case it benefits all road users alike.

Speed Restrictions.

While the maximum speed allowed is twenty miles an hour, the automobilist is generally prevented from traveling at this rate when in populated districts by the clauses in the act forbidding "furious driving." The police officer, whose promotion seems to be dependent upon the number of convictions of car drivers he secures, nearly always makes charges under this clause, thereby avoiding the necessity of alleging any particular speed. As can be understood, to the average country magistrate—generally a gentleman with strong agricultural interests—any speed above walking pace appears to be "driving to the danger of the public which *might be expected to be* on the highway at the time." There is something delightfully vague about this last line which appears in the law. The local government board was empowered by the act of 1903 to reduce the speed limit to ten miles an hour, or even less, upon application by local authorities in cases were special danger would be caused by a higher speed, but, thanks to the opposition raised by the Automobile Club and the Motor Union, only half a dozen such limits have been imposed.

Every breach of the act, whether through some slight technical error or by a more serious offense, carries with it endorsement of the conviction on the driving license, the sole exceptions to this rule being the first and second infractions of the speed limit clause. When the unfortunate driver has three offenses recorded against him on his license, this license is withdrawn, and under a big penalty he is debarred from driving a car or from obtaining a new license until the present act has expired, which will be December 31, 1906.

Gathering Evidence for New Law.

However, the Motor Car Act was admittedly an experiment, and future legislation may prove more favorable. At the present time public opinion has been greatly aroused by an unfortunate series of automobile accidents, which, while not disproportionally heavy in comparison with fatalities due to other classes of vehicles, have been so magnified and exaggerated by the sensationalist newspapers that any attempt at automobile legislation at this time would probably be very oppressive. Hence all automobilists have welcomed the institution of a royal commission, which will hear all evidence and then report to Parliament as to what legislation is required. The motorists' case is being presented by the Motor Union, backed by the Automobile Club, and for months past evidence has been collected of police persecution and other injustices.

The wish of the general body of automobilists is to make proficiency in driving a necessary condition for obtaining a license and in return to have the speed limit abolished. While the penalties for dangerous driving might be made even more severe, it is felt that the many petty offenses which the driver is at present liable to commit might be abolished. It is also desired that revenue accruing from taxation of autos should be spent on the maintenance of the

roads. If this were done, a tax, graduated according to horsepower, might be arranged so that owners of high-powered cars should contribute more to road maintenance than the user of the modest runabout.

Suggestions for Tourists.

For the information of Americans who may be thinking of bringing their cars over for a tour in the islands, a note on the necessary formalities may be useful. There is, of course, no customs duty to be paid on the car when entering the country. Forms for registration can be obtained upon application from the local licensing authority—the town clerk if in a city like Liverpool, or the clerk to the county council if otherwise—and on payment of $1.25 (5 shillings) a license will be issued, allowing the holder to drive a car in any part of the British islands, and for $5 (£1) an identification number will be allotted. This must be painted on the front and rear of the car, or on plates attached, which must be in accordance with the regulations as to size, color, etc. This done, the tourist is at liberty to start on his tour, always remembering, however, that the rule of the road is the opposite to that in America; that is, the driver must keep to the left of the road except when passing another vehicle from behind.

Features of Leading French Cars for 1906.

From Our Own Correspondent.

PARIS, Oct. 27.—One of the first French firms to complete its 1906 models is Charron, Girardot & Voigt. Construction of parts for next season's machines began as early as last May, so that by the end of October the first of the new cars were ready for delivery.

In the new model the three-point suspension has been adopted for the motor and change-speed gear-case. The two-to-one gear is completely enclosed, as well as the rear brakes, which have been very greatly increased in strength. In the 20- and 30-horsepower cars the magneto is placed on the inlet side of the motor, while on the 50- and 75-horsepower models it is carried on the exhaust side. On the 20- and 30-horsepower models there is the usual change-speed gear with parallel shafts and direct drive on fourth speed. The 50- and 75-horsepower models have double sliding gear. All important parts are of nickel steel, and each of the differential shafts in all types is in one piece.

In addition to their standard models, Charron, Girardot & Voigt are bringing out a very handsome automobile intended especially for town use and selling at $2,700 for the chassis only in France, (The same chassis landed in America would cost fully $4,000 when the 45 per cent. duty and the freight and other charges are added.) It has a 14-horsepower four-cylinder motor inclosed under the usual C. G. V. form of bonnet; a low frame, the height from the ground being but 52 centimeters (20.48 inches), equal-sized wheels of 815 by 105 millimeters (32.09 by 4.13 inches), propeller shaft drive, Simms-Bosch magneto and small accumulator to facilitate the starting of the motor, 30 liters of water under pressure, four speeds and reverse with direct drive on the high.

The most noticeable feature of this town car is that the driver's seat, instead of being at the right, is now to the left. It is claimed that this position will be much more convenient for driving in crowded streets, as it enables the driver before passing a vehicle to see that the road ahead is clear, and renders turning around a most simple operation. The steering wheel and controlling levers are placed in the middle and the footman occupies the right-hand seat. In this position he can descend to open the door of the car without being obliged to walk around the end of the car. Simplicity and comfort have been especially studied in this car. Every mechanical part is inclosed and the vehicle is as silent as an electric. Ball bearings are fitted throughout, hot water circulates around the carbureter, and in addition to the two longitudinal front springs there are two rear *C* springs and one rear transverse spring. The space reserved for the body is 2.3 meters by 80 centimeters (70.5 by 31.5 inches), which allows a side entrance and a width of body of 90 or 95 centimeters (about 35.5 to 37.4 inches). With a coupé or landaulet body this new town vehicle is one of the most luxurious and at the same time most practically convenient automobiles yet constructed.

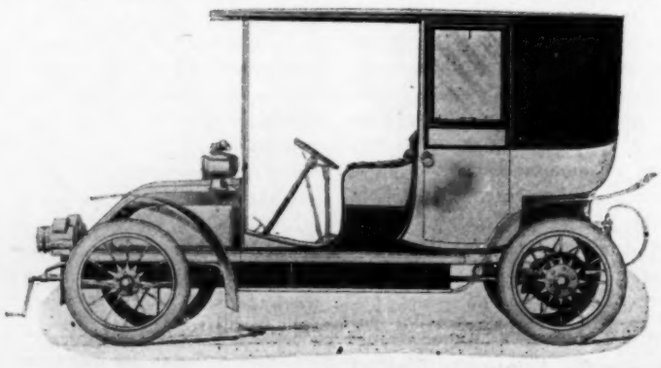
Four New Hotchkiss Models.

Hotchkiss cars will be well represented at the forthcoming salon. Although the new models are not yet definitely decided upon, some particulars have been obtained regarding what may be expected next year. There will be four models: Type *C*, with 29-horsepower motor under the seat, at $3,400 for the chassis in Paris; type *F*, 29 horsepower, 112 mm. bore and 120 mm. stroke (4.4 by 4.7 inches), at $3,200; type *J*, 35 horsepower, 115 mm. bore and 120 mm. stroke, at $3,600, and type *D*, 42 horsepower with motor of 120 mm. bore and 150 mm. stroke (4.7 by 5.9 inches), listed at $4,400 for chassis only in Paris.

The most interesting model is the type *J*, the chassis of which has been especially constructed for touring purposes, and while the motor is powerful enough for any carriage work, however heavy, it cannot be classed with the monsters which use large quantities of gasoline and are expensive in tires. It can attain a speed of upwards of forty-seven miles an hour and is exceedingly robust, supple and silent. General lines of construction are retained, including shaft drive, which has given much satisfaction. Ball bearings which were employed on the first Hotchkiss cars will be retained, being fitted in every part of the engine where possible, including the crankshaft bearings. A new carbureter will be brought out which will contribute to the flexibility of the car and facilitate slow running on fourth speed for town work. Ignition has been especially studied and customers will have the choice of two systems, either high tension by magneto and sparking plugs, or low tension with make and break in the cylinder. Both of these systems have been perfected so as to render the up-keep as low as possible.

Modifications in Mercedes Chassis.

The 1906 model of Mercedes chassis has not yet been brought out, but particulars as to what may be expected have been obtained from headquarters. The well-known Mercedes metal clutch which has given satisfaction in the past will be retained. It will, however, undergo a few modifications, the most important being the introduction of a system of lubrication so as to obtain more suppleness and make the car easier to to handle in town use. The motor, in its general lines, will be the same as the Mercedes Simplex since 1902, with some rather important modifications in the sparking mechanism, which, while it remains the same in general principles, will be much more easily dismounted and have greater qualities of endurance. The combustion chambers will be modified so as to give 4 or 5 horsepower



C. G. V. 1906 TOWN CAR WITH COUPE BODY.—Driver Sits on Left Front Seat. Levers in Center. Note New Form of Rear Springs.

more than in the past. Thus, next year, instead of 28-32, 40-45 and 65 horsepower, the types will be 30-35, 45 and 70 horsepower. The pump will be more powerful and the well-known type of honeycomb radiator will have an increased capacity. In the 1906 model the regulator gear instead of being behind the motor will be placed in front of it, between the radiator and the motor. It will be completely inclosed in an aluminum case, rendering the engine much more silent than in the past.

The gear box is quite new, stronger than heretofore, and the fourth speed is in direct engagement by an entirely new method. When the fourth speed is being used all the other gears are stationary, thus making the car more quiet and reducing frictional losses of power.

Pressed steel frames will be used as heretofore, the length for side entrance cars being 94 inches, but instead of elliptic springs, excessively long (55 inches), straight springs will be employed with a new combination of spring hangers, permitting the use of a body of 94 or 141 inches without any decrease of stability.

A new carbureter will be used in 1906, particulars of which cannot be made known until patents are obtained, but which it is declared will give economy in consumption and contribute largely to the smoothness of operation of the car.

New Darracq Clutch and Control.

A visit at the Darracq factory at Suresnes, Paris, reveals the greatest activity. At present the first series of 600 cars for next season is well under way, and as soon as these are out other equally large series will be started. No change in the conditions of sale will be made next year, the arrangements in effect during the past few years having given entire satisfaction. A great increase in the number of cars exported to America is certain, declared one of the heads of the firm to The Automobile representative, but no change will be made in selling prices.

In essential features the 1906 model will not be a great change from that of this year, but several improvements have been adopted which should certainly be appreciated. The adoption of a progressive clutch is the most important change. The leather-faced clutch is retained, but four studs, placed semi-distant, pierce its circumference near the outer edge, raising the leather very slightly. Within the cone are bolted four metal sleeves that contain the terminals of the studs and a spring of special construction. The pressure of the springs acting through the broad-faced studs on the surface of the female cone prevents the clutch being let in with too much force; even if the foot were suddenly released from the pedal these springs would take up so much of the impetus as to prevent breakage. It has been found by practical tests that the spring studs on the clutch give an admirable slipping surface, making it possible to drive the car at a rate of a mile an hour with the greatest ease.

Push-down or piano pedals have been abandoned for pedals of the push-forward type, which have been given a long leverage and been so placed that the foot is in a natural position when pressing home. The pedals are but two in number, the left one acting on the clutch and at the same time diminishing the supply of gas so as to prevent the motor racing when suddenly relieved of a load. The right-hand pedal withdraws the clutch and controls an internal expanding brake acting, metal to metal, on a drum just behind the change-speed gear. There is only one hand lever, which controls internal expanding brakes on the rear axle. This, however, is not needed for ordinary use and would be omitted if automobile regulations did not demand its presence. Everything connected with the control of the car is thus placed on or around the steering wheel, the change-speed lever being just below the wheel. The driver of a Darracq car can entirely control every movement of his vehicle without moving in his seat, an advantage which is appreciable on a long run.

Krieger Electrics and Combination System Truck.

The most important of the French constructors of electric automobiles, the Kriéger Company, intends to exhibit in the salon an electric landau, a three-quarters landaulet, a victoria, an omnibus and a gasoline-electric chassis. In the industrial section will be exhibited a gasoline-electric omnibus and a combination system truck with powerful electric searchlight for army work. This latter was successfully employed in the recent French army maneuvers. Some time ago the Kriéger Company sold its patent rights for America, but cars have never been constructed in the United States, notwithstanding very favorable engineering comment. The gasoline-electric system consists of a 20-horsepower, four-cylinder vertical motor with magneto ignition and running at 1,200 revolutions a minute, directly connected with a dynamo by an elastic coupling. The power developed by this group is equally distributed to two electric driving motors acting separately on the rear wheels.

Peugeot Bringing Out Runabout.

Perhaps the most important feature of 1906 will be the appearance of the Peugeot runabout. At present the big French firms find the construction of powerful high-class automobiles so profitable that they pay no attention whatever to popular vehicles, with the result that there is great danger of France being left solely as a constructor of expensive automobiles. The firm of Peugeot Frères is about to remedy this defect by bringing out a reliable runabout at a price well within the reach of the great middle class. There are indications, too, that this will be but the beginning in France of the runabout as it is known in the United States. The new Peugeot machine, full particulars of which have not yet been made public, will be constructed in series of 1,000. The wheelbase will be 78 inches, track 45 inches, and the weight, including tires and sparking apparatus, will be 737 pounds. It will carry a two-seated body weighing about 154 pounds, giving a total weight of 891 pounds. The new vehicle will be thoroughly well constructed on the lines of the big touring cars, the whole mechanism being strong and not likely to get out of order. It will consume but little gasoline and the upkeep of tires will not be high. Peugeot Frères have won a reputation as builders of bicycles and motor cycles, their factory at Valentigney in the department of Doubs turning out no fewer than 50,000 machines annually, and with their past experience, extensive means of production, and the building of cars in large series, they may be expected to produce in their 1906 runabout a popular machine and one that will probably increase the popularity of the small car.

Renault Four-Cylinder 10-H.P. Car.

Renault Frères state that the changes in their 1906 model have not yet been definitely decided upon. It is known, however, that the firm will bring out a new 10-horsepower, four-cylinder car specially constructed for town use in which silence and flexibility have been made strong points. This is probably the smallest four-cylinder motor yet constructed.

NEW LICENSES IN PENNSYLVANIA.

Philadelphia, Nov. 6.—Under the new Pennsylvania automobile law, which goes into effect January 1 next, the enforcement of the provisions of the law will come under the jurisdiction of the State Highway Department, immediate supervision of the details, however, being the work of the State Automobile Bureau, of which H. M. Cutshall, former member of the legislature from Crawford county, will have charge.

Licenses will be issued by the State Highway Department, instead of by the prothonotaries, as heretofore, and after January 1, 1906, it will be unlawful to operate automobiles in this commonwealth without a license from the former. With each license will be furnished two tags, one for the front and the other for the rear of the machine, and the latter must be so placed as to be easily read day or night.

Up to date no information has been published to indicate that all applications for licenses will not have to be sent direct to Harrisburg. It is hoped, however, that before the first of the year the State Highway Department will open suboffices here and in Pittsburg and other large cities.

There was a time when if we saw an automobile in town we would follow around a half day if necessary to find out who owned it so as to write it up, but now a person will hardly turn his head, they are so plentiful.—South Dakota *Exchange.*

On Magneto Ignition—Low Tension Systems.

FROM a mechanical point of view, the magneto machine should not present any great difficulty to those who have trained themselves to understand the organism of a modern motor car. Still, the fact remains that many motorists, thoroughly proficient in other respects, have but a hazy idea of the methods employed to ignite the charge in a gasoline motor. The reason for this is not far to seek, says a writer in the *Autocar*. There is something intangible and abstract about electricity which engenders a feeling of respect, and almost of fear, in the minds of many who would willingly tackle the most difficult mechanical problem. In the first place, it is almost impossible to describe electricity itself, or to account for its production. A comparison with a more familiar form of energy, namely, heat, may help.

We know that heat can be generated by many means. For instance, the combination of certain chemical substances will produce heat. In some cases the evolution of heat will be very rapid and an "explosion" will result; in others, the heat will be far less intense and we may only obtain a slight rise in temperature.

Electricity may also be generated in a somewhat similar manner; hence the primary battery and the "accumulator," or secondary battery.

We have grown accustomed to the idea of heat; our experience of it dates back to our earliest childhood. But our respect for heat has worn off with years and we do not realize that the question, "What is heat?" has caused as much trouble among scientists as the question, "What is electricity?" Hence we are prepared to study the heat engine in its many forms, but are often awed by the simplest piece of electrical apparatus.

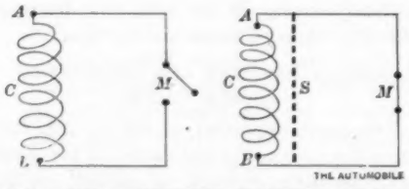
Heat can also be generated by motion. A body passing through the air becomes heated. If it passes rapidly, the heat may become so intense that the body catches fire. Electricity, too, may be produced by motion, but the motion must take place in a suitable medium. The common magnet is well known to all and we know that its influence is felt to a considerable distance in the space surrounding it. This space is called the magnetic field. Now, if a bar of metal be moved through a magnetic field in certain directions, an electric current will be generated in that bar. When the motion ceases the current dies away.

Here, again, the production of electricity is really no more mysterious than the production of heat. Yet we profess to understand readily why a bearing runs hot or a tire warms up in traveling along a road; but we are apt to regard the electric current produced by a magneto as something altogether beyond us.

After all, the principle is simply this: A conductor of electricity is moved—usually rotated—in a magnetic field and a current of electricity is thereby generated. A rapid motion will produce an intense current—a current, in other words, of high pressure or high voltage, whichever term we prefer to use. When once this fundamental principle is understood and taken as an acknowledged fact, the rest is comparatively easy.

There is one more point on which the "heat" analogy may be of help. If we wish to light a match, it makes no difference whether we rub the match along the box or the box along the match; the necessary heat is produced all the same. Similarly, it does not matter whether we move the electric conductor across the magnetic field or the field across the conductor; in either case an electric current is produced in the conductor.

We have assumed that the conductor consisted of what is called a "closed" circuit—that is, a complete ring or path along which the electric current may flow. When



FIGS. 1 AND 2.—SHOWING ELECTRIC CIRCUITS.

the conductor is incomplete, or, in other words, forms an "open" circuit, no current can flow, though the tendency is the same, and the current is, as it were, only waiting for a path along which it can travel.

The annexed diagrams may help to make this clear. Fig. 1 shows an open circuit, the coil *C* being the conductor, which moves in a magnetic field. In this case, no current flows, but the two ends of the conductor *A* and *B* are at different potentials. In other words, there is a pressure or "voltage" there, waiting to urge the current through the circuit, which happens when the circuit is closed, as in Fig. 2. This voltage exists so long as the conductor continues to move through and cut the magnetic field. In Fig. 2, the part *A M B* is called the external circuit, *M* representing a "make and break." If the terminals *A B* were connected by a short thick wire, shown dotted at *S*, the coil *C* would be said to be "short-circuited."

We are supposing the coil *C* to be moving and the current to be flowing (Fig. 2.). Now let the circuit be suddenly broken at *M*. The current will make a sort of dying effort to continue, and in so doing will cause a spark to pass at *M* at the instant that the circuit is broken. This is the method of the low-tension magneto, which we are now in a position to consider rather more fully.

We may first turn our attention to the field magnets, in the neighborhood of which our conductors of electricity will be caused to revolve. These magnets are usually of the "horseshoe" type, and are constructed of special steel. This is not so readily magnetized as iron, but is capable of retaining its magnetism almost indefinitely. The "horseshoe" shape is convenient on account of the ease with which the conductors may be arranged to rotate between

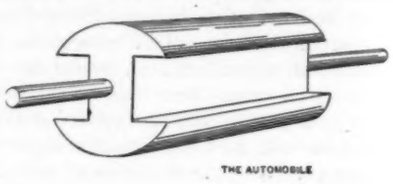


FIG. 4.—SKETCH OF THE ORDINARY H ARMATURE AND ITS SHAFT.

the poles in the strongest part of the magnetic field between them.

This field is clearly shown in Fig. 3 and it will be instructive to consider how this diagram is obtained. A field magnet, carrying cast-iron pole pieces, is placed in a horizontal position. A piece of paper is laid upon it and iron filings are sprinkled upon the paper. These iron filings arrange themselves roughly along the magnetic "lines of force" and when the paper is gently tapped the diagram at once becomes more clearly defined.

The iron filings, under these conditions, have become temporary magnets, and, acting like a number of small compass needles, arrange themselves in rows along the lines of force. The diagram is obtained from a photographic negative, showing the iron filings as white lines on a dark background.

It is a well-known fact that other metals do not resemble iron in respect to its magnetic properties. Iron has the peculiar faculty of itself becoming magnetic when placed in a magnetic field. Were a piece

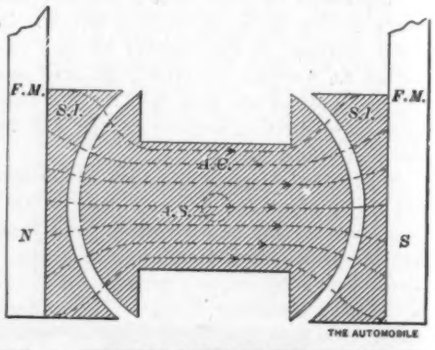


FIG. 6.—SHOWING LINES OF FORCE BETWEE MAGNETS AND ARMATURE. ARMATURE IN HORIZONTAL POSITION.

A C, armature core. S I, soft iron pole pieces.
A S, armature spindle. N, north pole of magnet.
F M, field magnets. S, south pole of magnet.

laid between the poles of the magnets, the magnetic lines of force would be considerably distorted and would no longer be practically straight as they are in Fig. 3. The iron may be said to be a good conductor of magnetism. In other words, the lines of force will pass much more readily through iron than through any other substance. It follows that in order to make the best possible path for the lines of force

it is advisable to fill the greater part of the space between the field magnets with iron. It is, of course, necessary to leave sufficient room for the coil in which the electric current is to be generated. We can best effect our object by winding this coil upon a soft iron core, which may be of the shape shown in Fig. 4. The spindle of the core runs in bearings and the size of the core is such that it may be rotated between the poles of the field magnets without actually touching them. The air gap between core and magnets should be as small as possible.

Fig. 5 shows an "iron filing" diagram, taken with a soft iron armature coil placed between the poles. The air gap is greatly exaggerated in order to show more clearly the distortion of the lines of force. These no longer pass straight from one pole to the other, but take the shortest course into and out of the armature core.

It is as if the poles of the magnets were the banks of a river and the armature coil

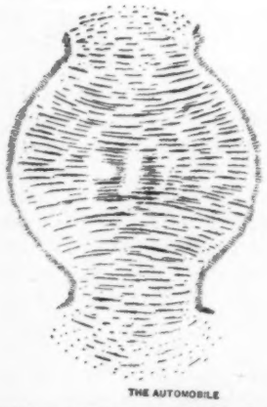


FIG. 3.—FIELD BETWEEN POLES OF HORSE-SHOE MAGNET.

were an island. A man wishing to cross from one bank to the other with the greatest ease would swim across the narrowest part of the channel, walk straight across the island and again swim the shortest possible distance to the other bank.

Suppose the island to be placed as in Fig. 6. The man's course is indicated by the dotted lines, which may be compared with Fig. 5.

Now let the armature be rotated through 90 degrees, and take up the position shown in Fig. 7. The man's course is again indicated by the dotted lines, and it will be easily seen that he would no longer cross at the same place.

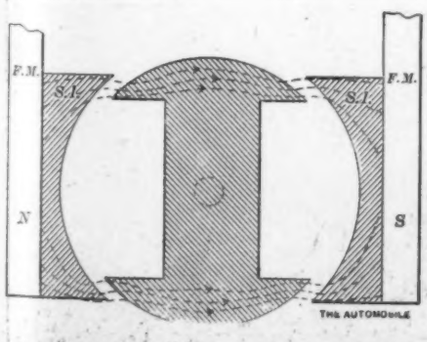


FIG. 7.—SHOWING LINES OF FORCE BETWEEN MAGNETS AND ARMATURE. ARMATURE IN VERTICAL POSITION.

Just as a man can travel more easily over land than through water, so the lines of force can travel much more easily through iron than through air, or any other medium. Hence Figs. 6 and 7 will give an accurate idea of the change in the distribution of the magnetic field when the soft iron armature core is rotated. Similarly, the pole pieces, attached to the poles of the field magnets, may be regarded as piers stretching out into the water to make the island more accessible.

FIG. 5.—ARMATURE HORIZONTAL. ALL LINES THREADING THE COIL. ZERO POSITION.

GENERATION OF THE ELECTRIC CURRENT.

The whole magnetic portion of a simple magneto is shown in Fig. 8, and we may now return to the subject of the generation of the electric current. We will consider what happens when one turn of insulated copper wire is wound round the soft iron armature core, and (when the electric circuit has been completed) is rotated between the poles of the field magnets.

Fig. 9 suggests a method of connecting up this wire. One end is attached to the soft iron core. On the shaft is a block of fibre or other insulating material, on the outside of which is a brass ring. To this ring the other end of the wire is connected. Now, if we connect the ring directly with the shaft by means of a conducting wire any current which flows out of one end of the coil will pass directly back through the shaft and the iron core to the other end of the coil. The circuit is complete and the coil is short-circuited. If, however, we wish the current to do some work in the external circuit, say to pass through the coil *C*, we must connect one end of *C* to the brass ring and the other to the armature shaft itself or some part of the machine which is in direct electrical connection with it. The circuit is still closed, but the armature is no longer short-circuited.

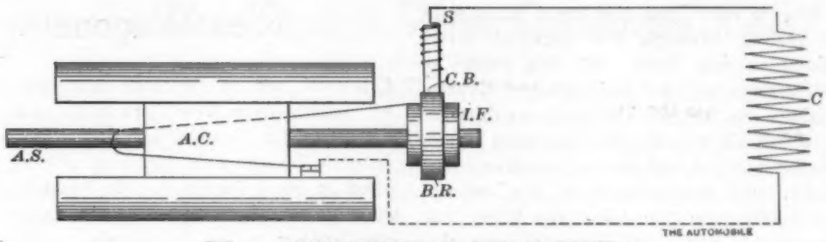


FIG. 9.—ARRANGEMENT OF WIRING CIRCUIT.

A C, armature coil.
A S, armature shaft.
B R, brass ring.
C, coil in external circuit.
C B, carbon brush held by S.
I F, insulating fibre.
S, spring.

The dotted line from the coil *C* (Fig. 9) indicates a connection through the frame, or, as it is commonly called, "grounded."

As we have already stated, the current is generated by the rotation of the armature coil in such a way as to cut the lines of force. It has also been shown that these lines of force may be fairly accurately represented by a number of parallel straight lines passing from pole to pole of the field magnets.

In Fig. 10, the path of a conductor forming a part of the armature coil is indicated by the dotted circle. When the conductor is in the position *A*, it is traveling vertically upwards, and its motion may be represented by the line *A a*. It will be seen that *A a* cuts the horizontal lines which represent the lines of force. When the conductor has reached the point *B*, its position is shown by the line *B b*, which, although of the same length as *A a*, cuts fewer horizontal lines.

The rate of cutting lines being reduced, a smaller current now flows along the conductor. When the point *C* is reached, the conductor itself is moving horizontally, and,

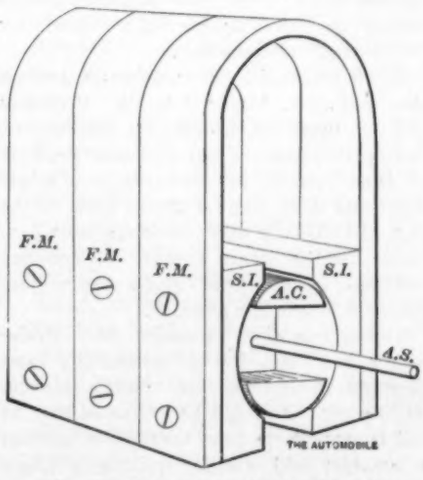


FIG. 8.—ARRANGEMENT OF ARMATURE BETWEEN MAGNET FACES.

A C, armature core.
F M, steel field magnets.
A S, armature spindle.
S I, soft iron pole faces.

as may be seen from the line *C c*, is simply gliding through the lines of force without cutting them. At this point no current flows and we have reached a "zero position." As the rotation continues through the points *D* and *E*, the conductor again cuts the lines, at first slowly, and then more rapidly, and the strength of the current rises. But now the lines are being cut downwards instead of upwards, with the result that the current flows in the con-

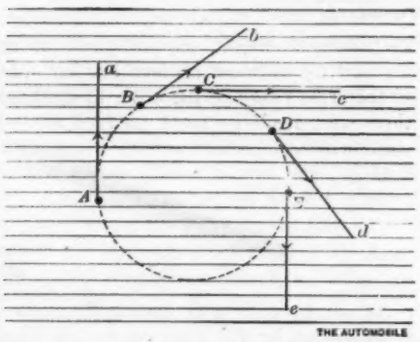


FIG. 10.—THE LINES OF FORCE IN RELATION TO THE CUTTING COILS.

ductor in the opposite direction. By the time that the point *E* is reached, the lines are again being cut at the maximum rate. Hence the points *A* and *E* give "maximum positions."

It is clear that in one revolution the current rises twice to a maximum and falls twice to zero. Also it is twice reversed in direction, *i.e.*, at each zero point. A current of this type is known as an alternating current. In practice, a large number of conductors forming a coil are used, but the reasoning remains the same.

(To be continued.)

AUTOS IN INDIANAPOLIS CAMPAIGN.

INDIANAPOLIS, Nov. 4.—The most sensational municipal campaign this city has ever known, with automobiles as the sole means of transportation for the mayoralty candidates, closed to-night. Each of the candidates of the two leading parties claims to have broken the record for "whirlwind" campaigning.

In all kinds of weather, at times through rain and mud, Mayor John W. Holtzman and his opponent, Charles A. Bookwalter, have gone about the city in autos, speaking at from four to ten minutes in a single night and in as many different parts of the city. Besides the night meetings, each candidate held a great number of noonday meetings in shops, in which automobiles played a prominent part.

Throughout his campaign Mr. Bookwalter, the originator of automobile campaigning in Indianapolis, used a Marion touring car. To-night he estimated that he had covered more than 1,000 miles without a puncture and without missing a single one of his engagements to speak.

Mayor Holtzman used a number of different machines in his campaign, and his mileage equaled that of Mr. Bookwalter.

Reo Wagonette Wins Economy Test.

SEVEN out of the nine machines that started from New York in the economy contest of the New York Motor Club went through the six days' running, and all finished in good condition. As reported last week the cars were started on Monday morning, October 30, for Philadelphia, a distance of 90 miles, and returned to New York on Tuesday. On Wednesday they went to Albany, 150 miles, returning on Thursday. Friday's run was from New York to Southampton, Long Island, 101 miles, and the return trip, the last of the run, was made on Saturday.

The total distance covered by the cars is not far short of 700 miles. The object of the contest was to see how much cheaper passengers could be carried by automobile than by the railroads for the same trips. As a result, the car making the most expensive run took its passengers through at a cost of $4.58 per passenger, as against the railroad fare of $14.53. This includes only actual operating expenses, wear and tear, insurance, and such items not being figured in the totals.

The practical nature of the event is emphasized by the fact that the winner is a commercial car—the Reo, a ten-passenger wagonette. This machine carried its full complement of passengers, of an average weight of not less than 150 pounds each, the entire distance—approximately 700 miles—at a total cost of $29.30. This figures out at $2.93 per passenger; the railroad fares for the same trips would aggregate $14.53 per passenger. The total cost per mile for the wagonette was 42.9 cents. The figures given are not merely for fuel consumption, but all operating expenses, such as the cost of gasoline, lubricating oil, repairs (materials used and time occupied), road tolls, ferriage and even fines for speeding. The latter item, fortunately, did not figure in the total of any of the competing machines.

As an evidence of the strictness with which expenses were charged, it may be noted that the winning car was charged $2.25 for the time occupied by passengers in walking up a hill on the road to Albany, the clutch of the car slipping so that the full power of the engine could not be used. The wagonette has a double opposed cylinder motor of 16 horsepower.

Second honors were won by a Reo runabout of 8 horsepower. This little machine carried no less than four passengers or else ballast sufficient to make up a weight equal to that of four passengers of 150 pounds each at a total cost of $13.54, or $3.3[illegible] 1-2 per passenger for the whole run. This car was charged $7.9 1-2 for gasoline and 2[illegible] 1-2 cents for lubricating oil, which were the lowest total figures made in the contest. The total cost per mile was 40 3-5 cents.

A Compound gasoline car of 15 horsepower got third place. This car carried five passengers at a total cost of $18.62 7-10, the gasoline costing $10.87 1-2 and lubricating oil $2.12. The total cost per passenger was $3.72 1-2, and the total cost per mile 54 3-5 cents.

The Wayne 20-horsepower car, carrying five passengers, was fourth, charged with $12.40 3-4 for gasoline, $2.10 for lubricating oil, and a total cost of $19.81 1-2; total cost per mile, 58 cents; total cost per passenger, $3.96 3-10.

Next to the Wayne came the Olds runabout of 8 horsepower which carried four passengers. This car shows a total cost of $15.86, and a total cost per passenger of $3.96 1-2, or only one-fifth of a cent per passenger more than the Wayne. The Oldsmobile used $10.35 3-4 worth of gasoline and 42 cents' worth of lubricating oil. Sixth was another Compound, also of 15 horsepower, though carrying four passengers only. Gasoline cost $10.34 1-4; lubricating oil, $2.13; total cost, $17.18 1-2; cost per passenger, $4.29 3-5.

The Marmon air-cooled 20-horsepower car was seventh, with a total cost of $22.91 1-2, or $4.58 3-10 for each of the five passengers carried. Gasoline cost $14.82 1-2 and lubricating oil $1.40; cost per mile, 67 1-10 cents.

The two cars that started but did not finish were the Frayer-Miller 24-horsepower air-cooled car and a 15-horsepower compound, the third Compound entered. The Frayer-Miller car unfortunately stripped a gear in starting on the third day's run, from

ONE OF THE TOURING CARS AT A PICTURESQUE POINT ON THE HUDSON RIVER IN LAST WEEK'S ECONOMY CONTEST.

New York to Albany, and was forced to abandon the contest. Repairs were effected in time to join the run unofficially during the last two days' trip from New York to Southampton and return; the machine ran, during the first and two last days of the contest, about four hundred miles, at a cost of $6.00 for gasoline and 55 cents for lubricating oil. Having missed the Albany run, however, the Frayer-Miller was not counted among the contestants.

Transmission troubles assailed the third Compound car. On the way to Albany the transmission gave out, and after a good deal of delay was replaced by a new one that had been wired for. A fresh start was made in the dark, but the car ran into a ditch and broke an axle, putting it out of the contest.

On the whole, mechanical troubles were remarkably infrequent, there being no mishaps of any consequence to any cars except, as already mentioned, the Frayer-Miller and the Compound; and even tire troubles were only occasional.

The figures given, while probably correct, may be slightly changed when the final official report is made up. This report, which will be issued in pamphlet form, will be very complete, covering every available detail of interest in connection with the test.

In charge of the run were E. T. Fitch, referee, who accompanied the contestants, driving a White steam car; W. J. R. Moore, chairman of the technical committee; and A. B. Tucker, secretary of the New York Motor Club. There were five ladies among the passengers, three of whom rode in the Reo wagonette and two in other cars. Only one case of personal injury was reported. A newspaper man who was riding in the Reo runabout as passenger stood up just as the machine was rounding a sharp bend in the road, and was thrown to the ground. His injuries, though painful, were not serious, and he was able to go up by train. For the remainder of the run the car carried sand ballast in lieu of two passengers, to make the load required by the rules.

Factory Experts View Customers' Cars.

SYRACUSE, Nov. 4.—A system of inspection of customers' cars by factory experts, adopted by the Franklin Manufacturing Company when it first started building automobiles, has been continued since with great success. There are now eight skilled men on the road representing the Franklin concern, which is thus able not only to give valuable assistance to customers, but to closely watch the cars in active service with a view to betterment in design or construction.

"We have made it a rule to inspect every car sold after it has been in use by the owner," said H. H. Franklin, in response to an inquiry. "We endeavor to do this in conjunction with the dealer selling the car. The object at the start was two-fold—to satisfy the customer and to gain information for ourselves.

"A four-cylinder air-cooled car was a new venture. Dealers and motorists said it would not go. Prejudice was everywhere. We knew the car would go, and spared no expense to so demonstrate. This perhaps in a measure accounts for our rapid growth.

"By keeping in close touch with the cars in this way, we gained a great deal of information quickly—that is, we found out without delay just how the cars were performing, and where improvements could be made. It brought us in close touch with the owner, and this personal relation continues to this day.

"Probably we are in personal correspondence with more owners of cars than any other manufacturer, and perhaps than all other manufacturers put together. In some measure this has brought about a condition hard to contend with. It has perhaps made the owner bring his troubles to us when he should have taken them to the dealer. About the only harm in this is that it causes delay because we invariably refer all complaints to the dealer, for the reason that the dealer is close at hand and can give prompt attention.

"The need for this work is a great deal less than formerly," continued Mr. Franklin. "Not only do the dealers and general public understand gasoline cars much better, but cars are better made, and purchasers have correspondingly less trouble.

"To follow out our policy costs a great deal of money. In some cases it might be said that it has cost more than the car was worth. For example: A man in North Dakota goes to Minneapolis or Chicago and buys a car. He is a long way from the dealer, and must depend largely upon his own resources to make repairs and adjustments. Distance, however, made no difference to us. We hunted out these cars and gave them exactly the same attention as that given cars close at hand. As a matter of fact, we gave more attention to cars remote to the dealer than to those near the dealer, as the dealer would look after such cars.

"I recall one special case which occurred before we had many cars out. A lumberman in Mississippi bought a car in Chicago. He had fairly good success with the car, and one day was surprised to receive a call from one of our experts. It is needless to say that the Franklin car stands high in that vicinity, and that we have made numerous other sales there.

"Many amusing instances have occurred. We once sent a man from Syracuse to a small town in Pennsylvania to fix a car which the owner wrote was absolutely no good, and which he said he would sell for old junk unless we made it right. In 'fixing' the car a repair man had taken the float from the carbureter and in some way it had been overlooked and no one thought to examine the carbureter again.

"In many cases we find that some repair man has attempted to make 'improvements.' He has 'improved' on the timing of the engine and in certain adjustments. In such cases we feel compensated for our trouble in that we not only straighten out the owner, but we also have the opportunity to set the repair man right."

REO WAGONETTE AND RUNABOUT FINISHING FIFTH DAY'S RUN IN ECONOMY TEST AT SOUTHAMPTON, LONG ISLAND.

Use of the Motor for Braking.

By RENE M. PETARD.

THE advantages to be gained by using the motor of a gasoline automobile as a brake, and the most advantageous method of obtaining a braking effect from the motor are subjects in which designers and automobilists are greatly interested. It is possible to use the motor as a brake, and to handle it in such a way that any desired braking power may be applied without altering the regular construction of the motor and without using the ordinary brakes. In order to do this the delivery of power from the motor must be stopped, but the motor must remain connected with the driving mechanism by means of the clutch, so that the braking effort will be transmitted through the driving system. This is a simple matter, as it is merely necessary to switch off the ignition current and so stop the explosions, while leaving the clutch engaged and the gears in mesh. Under these conditions it is now necessary to produce in the engine a resistance to the rotation of the crankshaft which resistance will be communicated to the rear wheels through the driving system.

Coasting Down a Grade.

If the car is permitted to coast down a grade with the engine in running condition and the clutch and high gear engaged, but the ignition current cut out, it will be found that the speed will be somewhat retarded by resistance set up in the engine. The braking effect will be very greatly increased, however, by engaging the low gear, as the engine must be driven by the car at a higher relative speed and the internal resistance is multiplied accordingly. If the lowest gear is used and the hill is not excessively steep, the car is apt to be brought almost to a standstill by the motor's resistance.

Granting that the engine actually produces the braking effect described (and proof is readily obtained by automobilists), it remains to discover the cause—to ascertain what takes place in the cylinders to produce such retardation. Probably the first explanation that would occur to most persons would be that the resistance is caused by the fact that power is required to compress the charges of gas that are drawn into the cylinders in the usual way. It is true that power is required to compress the air; but at first glance one would suppose that the energy expended in compressing the charge is given back by expansion on the down stroke of the piston—the stroke that would be the power stroke if the charge were ignited.

The friction of the rotating and reciprocating parts and of the air in its passage through the valves is a factor that is not of great weight, because it is usually brought down to the minimum by good workmanship, and is not sufficient to account for the resistance. Therefore it is necessary to go deeper for the explanation.

Ignition Switched Off.

Let us suppose that the car is running down grade, the motor, with ignition current switched off, being driven by the car. Each piston on its suction stroke will draw in a charge of gas, and this charge will be compressed on the following up stroke; the compression of the charge will absorb a certain amount of the energy that drives the motor, and the energy so absorbed will manifest itself in the form of heat; consequently the compressed charge will be heated to a degree depending upon the amount of compression. Now, if the compressed charge was allowed to drive the piston down again, the heat stored in the charge would be expended in doing this work. As the engine is being driven by external means, however, the heat is not so expended; the charge merely follows the piston, which is pulled down by the crank and therefore does not require to be driven and in the exhaust stroke the charge is expelled into the atmosphere.

Thus it will be seen that energy has been absorbed to aspirate the charge, to compress it and to overcome the frictional resistances set up in the motor, but that, theoretically at least, none of this power has been returned to the crankshaft.

A fact that goes to strengthen this theory is that at slow piston speeds the braking effect is very slight. This is quite in accordance with our hypothesis, because the slowly moving piston is unable to run away, so to speak, from the expanding charge, which is therefore permitted to expend a good deal of its stored energy in driving the piston downward.

The heat retained in the walls of the cylinder, after the motor has been developing power in the usual way, doubtless has a disturbing influence on the cycle of functions described, but nevertheless the theory seems to fit the requirements better than any other the writer can think of.

Builders Instruct Customers.

Several firms, including some in England, take pains to inform their customers as to the best way of braking with the engine. In some cars, such as the older Renaults with automatic inlet valves so arranged that the tension of the valve springs can be regulated from the driver's seat, a very effective braking resistance is obtained by placing the valve regulating lever in the position which gives the maximum spring tension, and then switching off the ignition current. The resistance developed, as already described, is considerably increased by the great friction caused by the charge passing rapidly through the restricted passages. The English "National" car goes a step further in this direction, for when the lever governing the lift of the inlet valves is placed in the position which gives no lift at all, the valves are held positively on their seats. Theoretically, the engine should be working against a vacuum. Practically, however, this is probably not the case, as the exhaust valve is doubtless caused to open slightly for a brief period.

Drawback to Engine Braking.

Motors whose valves are arranged as described give excellent results when used as brakes. There is, however, one great drawback to the use of the engine as a brake. The partial vacuum produced in the cylinder sucks in lubricating oil with great rapidity, the oil working past the piston rings and collecting on the top of the piston. When the ignition is switched on the exhaust will be smoky and evil smelling and the combustion chambers and spark plugs will soon be covered with soot.

This trouble is avoided in the English "Rover" cars, whose engines constitute very excellent brakes, owing to the special character of the valve arrangement. By means of a special pedal placed beside the brake pedal, a set of auxiliary cams can be slid under the valve lifters. The result of this is that the piston draws in a full charge on the down stroke and compresses the charge on the up stroke. When the piston is nearly at the top of its stroke the exhaust valve opens and the compressed gas escapes into the muffler; this cycle of operations is repeated at every stroke, the motor working as an ordinary air compressor.

Another method of producing considerable resistance in the motor, and a rather crude way, is to close both the inlet and the exhaust, while a small relief cock on top of the cylinder is opened. Thus the cylinder can be filled and emptied only through this small aperture, and it will at once be seen that the resistance set up is very great—so much so that the use of the low gear in braking is almost certain to stall the car even on a hill.

The simplest way to make the motor available for this form of resistance is to provide a throttle that closes tightly, and a valve of some sort to close the exhaust outlet, so that while the valves are not prevented from moving, their opening and closing have no effect. This form of engine brake is used on many European motorcycles, though in a simplified form. A tightly-closing throttle prevents the admission of gas, but the exhaust valve is permitted to perform its usual functions. Thus there is a braking effect during three strokes, and the exhaust valve opens in the regular course during the fourth.

Advantages of Engine Braking.

One of the advantages of braking with the engine is that use is made of the most elastic of fluids—air; and the retardation

is gradual and smooth unless a low gear is used, when the full possibilities of the system become evident from the powerful braking effect produced. In fact, the lowest gears should be used only with extreme caution, and the novice should avoid them altogether until he has become familiar with the working of this method of braking.

It is most comforting to the driver on a long, steep grade with the engine used as a brake, to know that he has entire control of the car without resorting to the ordinary brakes; that nothing is wearing out or overheating, and that he can continue to coast indefinitely without fear of trouble from his brake. Then, if an emergency arises, the ordinary brakes will be cool and in proper condition for immediate use.

Interlocking Devices.

A point that many automobilists will at once think of is that many cars are fitted with an interlocking device between brakes and clutch, so that when the ordinary brakes are applied the clutch will be withdrawn, making it impossible to use the engine as a brake and the ordinary brakes at the same time. The writer believes that the growing popularity of engine braking will lead to the discontinuance of the practice of interlocking the clutch with either hand or foot brake. Many manufacturers will say that they use the interlock because others do it; others will say that everyone does it because it has been done ever since automobiles have been in practical use.

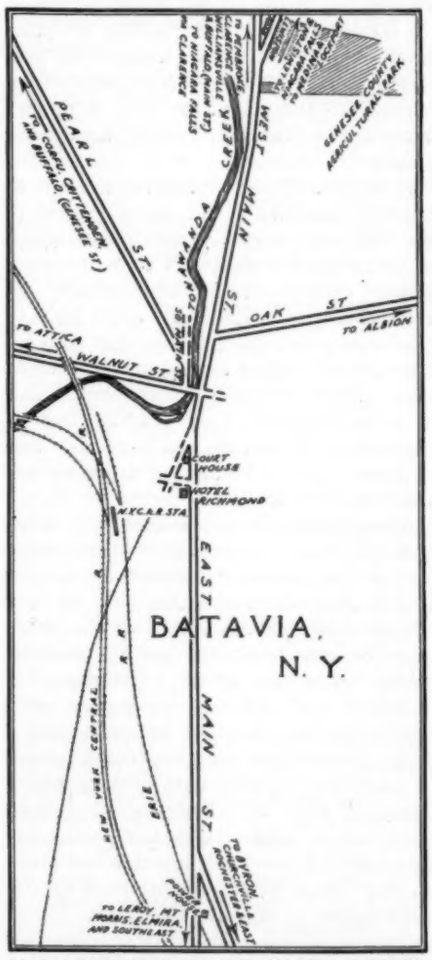
This takes us back to the first builder to use a brake interlocking with the clutch. Levassor, in one of the early Panhard & Levassor cars, was out one day and was driving on third speed at a dangerously high rate of about twelve miles an hour, when he got into a corner, lost his head for an instant, and applied his brake forcibly without withdrawing the clutch. The car car came to a standstill, but his gears were thoroughly ground up. As a result of this experience, Levassor, to save his customers from similar experiences, fitted all his cars with an interlock which withdrew the clutch when the brake was applied, and the practice has been continued to this day. The writer sees no necessity for it now; and even if a manufacturer considers it necessary, why cannot he place the interlock between the gear shifting lever and the clutch?

Two distressing fatalities, resulting from automobile accidents, occurred in Europe during the past season; in both cases expert evidence showed that the brakes had been set as hard as possible, but that they were not in proper condition to hold the car. In both cases, also, the clutches had been automatically withdrawn by the setting of the brakes. Who can say that these accidents would not have been avoided if the clutch had been allowed to remain in engagement and the engine had been used as a brake? Surely, this is enough to make any man think twice before deciding against the use of the engine as a brake.

Road Directions at Batavia, New York.

By ROBERT BRUCE.

THE attractive little city of Batavia, N. Y., located about midway between Rochester and Buffalo, has the special importance of being located on the two principal trunk-line highways between the Hudson river and the great lakes. The main-traveled route from Albany, Utica, Syracuse and Rochester practically due west through central and western New York state, comes directly into Main street, Batavia. So, too, does the other line, across the Catskill mountains, through Binghamton, Elmira, Bath and Mt. Morris, the two forming an angle near the



MAP SHOWING MAIN AUTOMOBILE ROUTES THROUGH BATAVIA, N. Y.

street railway powerhouse, indicated on the map. They are one through the business center of Batavia, but a short distance the other side of the city, two much-traveled routes to Buffalo divide.

Aside from being the largest place between Rochester and Buffalo by one route, or between Elmira and Buffalo by the other route referred to, with best accommodations for men and automobiles, Batavia is a local center for various fine runs off of these main trunk lines, stretching East and West. Among these may be mentioned Albion and Lockport, farther north, and the Niagara frontier, north-by-west, the latter of which may be reached by either Lewiston or Niagara Falls, if desired, without the necessity of going via Buffalo. All things considered, Batavia is of more importance from an automobile touring standpoint than its population and location would indicate at first glance.

The accompanying diagram will give the tourist who is interested a practical idea of the different routes passing through Batavia in the principal directions. Naturally the most traveled one is that directly between Rochester and Buffalo, to which Batavia stands somewhat in the relation of a half-way house. In connection with this run it is vitally necessary for the tourist to decide before moving west through the business center which one of the two routes he wishes to use to Buffalo. Unless he does this, the result is likely to be an error, to be remedied by going all the way back.

En route from Rochester, over the most direct line via Churchville and Byron, the tourist comes, as already stated, directly into East Main street, which is followed through the business center, past the court house, the park and the Richmond Hotel. Continuing west without making local inquiries, one's natural inclination is to continue from East Main street through West Main street (the court house the dividing line between them) and out into the country that way. This depends altogether upon what route it is desired to use the balance of the way to Buffalo.

As a matter of fact, the principal old line of travel leaves West Main street two blocks beyond the Richmond Hotel, turning left there to cross the Tonawanda creek bridge. Make immediate right turn (for the moment on South Main street), then bear left into Pearl street, which is the beginning of the line straight through Corfu, Crittenden and other minor points into Genessee street, Buffalo. This exit from Batavia, easily seen from the accompanying sketch, is a very difficult one to describe in type alone; tourists on the endurance runs to Buffalo in 1901 and to Buffalo and Pittsburg in 1903, will easily recall this point.

The other through line exit to the West, which many tourists have come to prefer on account of a considerable stretch of new state road from Clarence to Williamsville—excellent—is via West Main street, keeping straight (or a trifle to the left), where the Lewiston road branches off to the right. This line runs through Pembroke, Clarence and Williamsville into Main street, Buffalo. Since the state road already referred to was built, considerable travel has shifted from the West Main street-Pearl street route into the West Main street route direct via Pembroke and Clarence; but as this is a com-

paratively recent thing, practically all guidebooks and route cards mention only the route which the endurance runs of 1901 and 1903 followed.

Next in importance to the Rochester-Buffalo routes through Batavia is the connection between Batavia and Leroy, to the south, which is the route used to enter Batavia from the Catskill mountains across the "Southern Tier," via Binghamton and Elmira. This comes nearly straight into East Main street, whereas it will be noticed that the Rochester road enters the same thoroughfare at more of an angle. Traveling west this will take care of itself, but traveling east through Batavia it will be necessary to choose between the road to Byron, Churchville and Rochester, and the one to Leroy, Mount Morris, Batavia, Elmira, Binghamton, etc. In either case keep out East Main street, from center of the city until the street railway powerhouse is seen just ahead, alongside the Erie R. R. tracks. The left turn at that point is the beginning of the run to Rochester, while straight ahead, across the Erie tracks, is the way to Leroy and points beyond.

Walnut street and Oak street, as shown on the diagram, are beginnings of local runs to Attica and Albion, of little interest, probably, to the through tourist. The Lewiston road, used as the beginning of the run to Medina and Lockport, as well as to Lewiston and Niagara Falls, might at any time be of useful interest, suggesting the possibility of a good cross-country trip, varying the better-known trip via Buffalo. It is also possible to take the West Main street route to Clarence and thus run to Niagara frontier points still another way.

The Pennsylvania Railroad Company has recognized the need of transporting automobiles from one city to another, and has for this purpose provided cars of a special pattern. Recently it took up the matter of preventing any danger from fire by adding a special paragraph of instructions to shippers. This notice is intended primarily for the shippers of gasoline autos and was sent out by Charles Watts, general superintendent of passenger transportation on the lines west and by C. M. Shaeffer, acting in the same capacity for the Pennsylvania Railroad Company. The notice follows:

"Horseless vehicles operated by electricity offered for shipment must have their terminal wires, *i.e.* wires connecting battery with motor, disconnected. Vehicles operated by gasoline or naphtha must have tanks emptied, the tank cover or plug removed and packed separately, and the sparking wire detached."

That the automobile is booming in Syracuse is inferred from the fact that the Secretary of State has issued 300 licenses to residents of this city. In several cases some citizens have taken out more than one license.—Syracuse *Journal.*

Unfavorable Newspaper Influence and How to Counteract It.

EVERY person directly interested in automobiles and automobiling probably is well aware that there is a great deal of unfavorable comment in the newspapers throughout the country regarding the use and abuse of the machines in the public highways. It is unlikely, however, that more than a very few have any real conception of the great volume of adverse criticism there is in the aggregate. Only one who keeps in touch with popular sentiment and local news in all sections of the United States by means of correspondence and reading of press comment is in position to estimate the prodigious amount of matter derogatory of the automobile and its owner that is printed every day of every week during the driving season.

It is certainly not overstating the fact to say that one-third of the space devoted in the daily and weekly press to the subject of automobiles is filled with accounts of accidents caused directly or indirectly by automobiles, to arrests and trials for excessive speeding, to civil suits and criminal prosecutions against owners and drivers of cars, criticism in the editorial columns and in communications from readers, and to suggestions for and discussion of laws and ordinances aimed at the regulation or repression of automobiling.

Almost anyone keenly interested in automobiling would be staggered if he could have the opportunity to examine one week's accumulation of press comment on the subject and note the nature of the thousands of items published and the state of public feeling they reveal. The matter is a serious one, for the newspapers mold popular opinion, and also reflect it, and a continuance of such a state is almost certain to result in a crystallization of unfavorable sentiment that will bring about drastic action sure to have an unwelcome—and unnecessary—effect. Evidences that this process has already begun are not wanting. A news report from New Brunswick, N. J., on August 28 last, told of the formation of the Highway Protectors' Association for the purpose of "protecting the highways against encroachment by automobiles." The methods by which the society purposed to accomplish this were explained in the report as follows:

> "The Society will endeavor to have enforced the present automobile laws, and if these are found to be insufficient it will endeavor to have other laws passed. It does not desire to oppress those who own and use motor cars or to deprive them of their rights, but it means to see that farmers are protected and that automobilists do not endanger life by reckless driving. It will keep a record of the violations of the law and prosecute offenders. It will also organize a press-clipping bureau, and keep a record of all the accidents of the state, and the number of the machines figuring in them."

Early in September a similar movement was started in North Branch and the intention was announced of endeavoring to extend it throughout New Jersey. Under the name Anti-Automobile Association of North Branch a permanent organization was effected and a set of resolutions adopted declaring that, as citizens of the commonwealth, the members had built and maintained the public roads, from the free and safe use of which they were deprived "by reason of the manner in which some automobilists operate and run their machines, especially on the country roads, in utter disregard of law, or the right of the public to use the public highways, endangering the lives of those with whom they come in contact." They adopted resolutions in part as follows:

> "That we unite to form an association to act in accord with other associations formed, or that may hereafter be formed, in this state having the same objects in view, viz., self-protection and the restoring of our rights to the free and reasonably safe use of our public roads.
>
> "Resolved, That as occasion requires we will adopt legal means if necessary to abate the evils above set forth and to obtain our just rights."

A fortnight later a mass meeting was held in Somerville, N. J., at which letters were read from several neighboring towns asking for copies of the resolutions of the North Branch Association and expressing the intention of forming co-operative associations. Before adjourning the meeting it was decided to oppose every candidate for the state senate or assembly who owned an automobile or who had ever been known to ride in one.

That the antagonism among the farming classes revealed by such public action is not in any sense local or confined to one section of the country is clearly proved by an almost identical movement that originated simultaneously in Mexico, Mo., where it was started by two judges, one of whom was recorder of the county. They circulated a petition calling a mass meeting in the court house for September 23—the day, by the way, of the elimination race for the Vanderbilt cup on Long Island. The movement was supported by business men, farmers and stockmen, and 1,000 men, women and children attended the meeting. The extreme element talked of boycotting the newspapers that favored automobiles and proposed resorting to pitchforks and firearms, if necessary, to make drivers of the machines use more caution in passing teams on the road. A committee of fourteen citizens appointed for the purpose

drafted a long resolution, of which the principal theme was a demand that all automobile owners be required to give bond before being allowed to operate their cars, so that all claims for damages or injuries might be settled promptly. This document is to be presented to the next Legislature (in 1907) with the request that it be enacted into a law.

Expression of animosity of drivers of horses on the roads toward the drivers of automobiles does not always take such peaceable and moderate form. Too many incidents have occurred in which individuals have sought to apply a cure in illegal and violent ways, as by threatening the occupants of a car with guns, and even shooting at the tires in the effort to cause punctures. A recent example of this is reported as follows in a Wisconsin newspaper:

> "There is reason to believe that farmers shot at Richard T. Robinson and his family a week ago while riding in an automobile near Racine. The party was ordered to stop, and upon refusal were shot at. An investigation has been going on and the authorities now believe that farmers, who had declared that they would have revenge on autoists because of runaways and accidents, mistook Mr. Robinson's touring car for that of one owned by another manufacturer of Racine who had defied the farmers. It is said that the shots were only fired for the purpose of ruining the tires."

While the most bitter feeling against automobilists exists in the rural sections, the sentiment is not by any means non-existent in the large cities, where automobilists have not only been the targets frequently of mobs of hoodlum children, with their heterogeneous collection of objectionable, if not positively dangerous, missiles, but have sometimes been threatened with violence after unavoidable accidents. A case of the latter sort was reported in the New York *Tribune* for October 3 in part as follows:

> Joseph Stande, an Austrian, "was running his machine, containing two women besides himself, in front of Proctor's Theatre, when William Lowery, twelve years old, of No. 235 West 121st street, confused by a car, got in his way. The boy's left foot was run over when he fell. Stande stopped, jumped out and asked the boy if he was hurt. The latter did not seem to think he was, so Stande started off." Then the crowd that was leaving the theatre got excited and started a wild chase after the machine through 125th street that ended at First avenue, where Stande was arrested by Bicycle Policeman Whitman. "The usual lynching was threatened, when the man was caught, and several policemen were required to restrain the crowd. Dr. Oltmer, of the Harlem Hospital, found that the boy's foot was slightly sprained."

Unreasoning as such action was, it is clear that it reveals a condition of popular feeling that must be reckoned with. The foregoing are given as samples of some of the news items that are appearing in the papers. In addition to the reports of accidents and arrests for speeding that are printed in the news columns, nearly every paper in the country feels called upon to give frequent expression in its editorial columns to the opinion of the editor or his assistants on the situation. Naturally, these vary as much in sentiment as the mentality of the writers and the conditions that exist in the various localities differ. Nevertheless, whether the writers are qualified to mold the thought of the community or not by reason of superior wisdom or training in thinking, a majority of the residents of a community find it easier to get their ideas from such editorials than to analyze the situation for themselves. With such a condition prevailing, it is easy to see the effect on the public mind that such a rabid editorial expression as the following from such an influential paper as the Chicago *Tribune* would have:

> "The automobile runs 'wild' over no fixed track—often on an unfamiliar road at a high rate of speed; its machinery is much more liable to derangement than that of the locomotive; there are no flagmen nor tower men along the way, nor any time tables. The management of such a machine requires a much greater degree of skill than that of a locomotive. Yet we find these terrible engines of destruction, capable, as one might say, of dealing death from both ends and the middle, often intrusted to the hands of a youth or an inexperienced man who may be by temperament or nervous organization wholly unfitted to discharge the duties even of a driver of gentle and well-trained horses. Of course the abuse of the thing has got to stop."

It might be expected that periodicals of the better sort, particularly those that seek advertising patronage from the manufacturers of automobiles and that are supposed to stand for industrial progress and the development of civilization, would be more temperate in discussing the problem of the use of automobiles in the highways, but note this quotation from *Harper's Weekly*:

> "This group of Sunday occurrences related on the front page of a Monday newspaper illustrates most of the characteristic diabolisms of the motor cars. They run over folks, they run down wagons, they scare horses, they dispute with railroad trains and with trolley-cars about the right of way. Sometimes, also, their steering-gear breaks, and they smash into something. The worst habit that the motor car has is to run into railroad trains. . . . The most shameful and outrageous propensity of the automobile is to run away after it has hurt some one. An automobile caught so doing should get the limit of the law, and if necessary the limit should be raised. How much law is applicable to such cases may perhaps become known some time when an automobile that has run over some one and got away is caught. Almost always these sneaking scoundrels escape."

When the editor of a paper has no fitting ideas himself on the subject or wants to strengthen the position that he has taken in preceding issues, he frequently reprints the editorial comment from a contemporary. Thus, a South Bend paper makes this quotation, with credit, from another Indiana newspaper printed in Elkhart:

> "Automobilists all over the country are doing more than any laws can do to make themselves hated by the public. The reckless manner in which they drive through the city and country, their apparent disregard of life and limb, the frequency of fatalities and of serious accidents, are causing the public to fear them, and fear always begets animosity. The automobile carefully driven is not an object of dislike, but when men go around corners in cities or in country regardless of what may be coming from another direction, when they go through the streets so rapidly that a pedestrian cannot cross when they are seen a block away, they are taking risks with the lives of their fellows that no man has a right to take. A return wave will come either by the restricted enthusiasm of drivers or from the animosity of the public. When it does, the automobile will be a good and not an evil."

It is quite true that some of the editorials are surprisingly fair minded and judicious, and undoubtedly they have a good influence in moderating the animosity engendered by disagreeable experiences on the road with reckless operators or by reading the less temperate criticism of other writers. Another example of this is an editorial that appeared some time ago in the New York *Sun* under the heading, "Earning Unpopularity." It read as follows:

> "In proportion to the number of automobiles now in use, and taking into account their comparative novelty, the accidents for which they are properly to be held responsible are remarkably few. Nor is there more public fear or dislike of a motor car and its occupants when they are behaving with decent and reasonable regard for the rights of other citizens than there is of any other class of vehicles and their users. Such incidents as this described in the news of yesterday give the key to any antagonism that may exist against automobiles and their drivers."

[Here was reprinted a news dispatch from Stamford, telling of "an utterly reckless chauffeur," who ran over a boy and, leaving "him for dead, kept on his devil-may-care course."]

> " . . . Stamford's reckless chauffeur was one of a class of motor car drivers who would be dangerous if in charge of any sort of vehicle. . . . They are responsible for whatever spirit of hostility to automobiles and automobilists is manifested by the public, and the interests of the automobilists would be advanced in every way if they would use their influence within their own ranks to suppress such nuisances. . . . The repression of individuals who for their own mistaken ideas of pleasure endanger the lives and safety of every one is an end motorists would find easy to accomplish if they wished to accomplish it."

(*To be concluded*).

The foregoing installment of this article deals only with the existing undesirable conditions. The concluding installment, to be published in an early succeeding issue, will present the suggested remedy.—Ed.

A Tour on the National Pike.

From Pittsburg to Wheeling, W. Va., and Cumberland, Md., in a Runabout.

By CHEVALIER JACKSON.

(*Concluded from page 487, issue of November 2.*)

IT was at Washington that we took to the National Pike. Over some hilly and, in spots, very rough road, we ran westwardly to Claysville, ten miles, and West Alexander, a quaint old town, seventeen miles. Descending the hill there we came upon fifteen miles of perfect roadway along Dickson's Run that carried us across the "pan-handle" of West Virginia and brought us to Wheeling, thirty-two miles from Washington and sixty-four miles from Pittsburg. In the suburbs of Wheeling we were advised to follow the trolley and pavement, winding far around the river hills to the gap through which the creek flows; but it was discovered that the old turnpike, with its excellent foundation and directness, was much the shorter and better route. It mounts the hill and affords a fine view of Wheeling, of the Ohio river and of Bridgeport beyond.

Wheeling has good hotels and supports a garage. A number of automobiles are owned in the city, notwithstanding which the horses, when meeting machines out on the roads in the suburbs, are exceedingly troublesome and stops are necessary as speed will endanger lives of drivers. In spite of our caution, one irate driver of a wagon filled with hogs, shook his whip at us and informed us that if his horse ran away we would have to pay for it. Retorts should be conciliatory for antagonism ultimately harms the automobilist. The teamster will outdo you in profanity, of which he is a past master. The great trouble is that few men know how to drive a troublesome horse. They allow the horse to stop and turn around. They say "whoa" when they ought to urge the animal on, with the whip if necessary, but keep him going, at all hazards. No man can guide a horse that is not going ahead, but swinging around with the driver as a pivot.

From Bridgeport, O., just across the river from Wheeling to Richmond, Ind., the pike is said to be in good condition, but we reluctantly retraced our way the second morning to Washington. From that place eastwardly to Scenery Hill (Hillsboro on the mile posts) twelve miles through a hilly, farming country, the road is good except for water-breakers. Krepps Knoll (twenty miles) is distinguished by a staff erected by the United StatesGeologic Survey. It is the highest point between the Allegheny and the Rocky mountains. For a wonder, the pike does not go over it. Coming out on a hilltop, a beautiful view of the Monongahela river greets one suddenly, and a half mile coast brings him to an ancient covered wooden bridge, with loose, rattling floorboards. It looked unsafe, but carried us safely over the Monongahela into Brownsville, twenty-four miles from Washington and fifty-six miles east of Wheeling. There are good hotels there, and gasoline can be obtained from a physician who uses two automobiles practically all the year round over all kinds of country roads. The birthplace of Attorney-General Knox is two squares from the pike, and the James G.

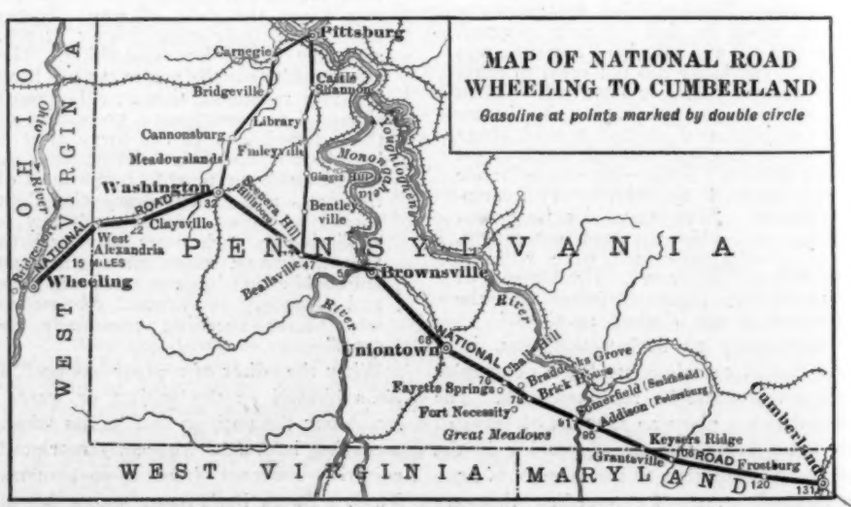
OLD MILE POST ON NATIONAL PIKE.

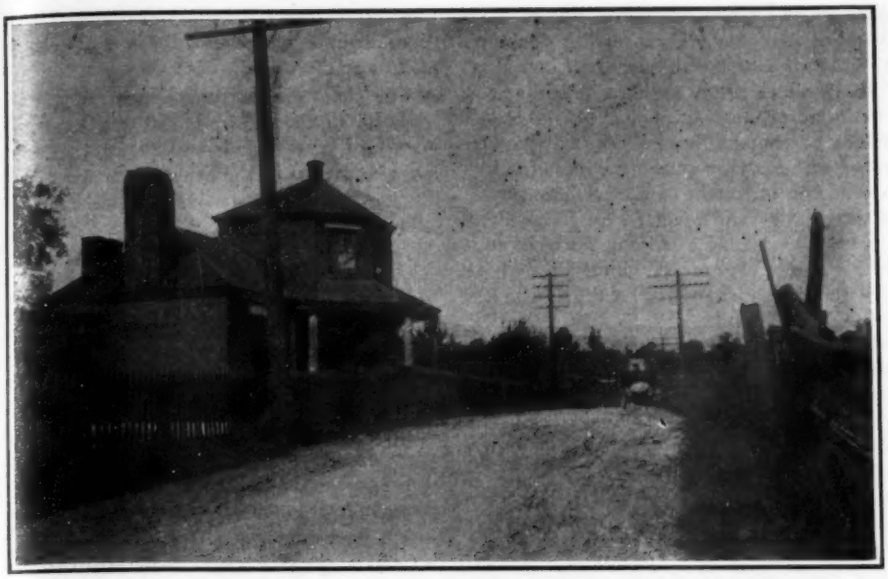
Blaine homestead is across the river, although only the old well now marks the place where the house stood.

From Brownsville to Uniontown (twelve miles), the pike has a fair surface. The wealth derived from coal and coke is shown in palatial residences as Uniontown is neared. A garage is supported there and good hotels are numerous. We filled our tank and took an extra five gallons of fuel in a can, as no gasoline is obtainable between Uniontown and Cumberland, on the Potomac, five miles south of the Maryland border. Even though the tank were large enough for a sixty-three-mile supply, leakage might not be discovered until the tank was empty. A few gallons in a can might save a long walk, or a night under the stars. The long coasts with the motor stopped save much gasoline, but the equally long low-gear climbs equalize matters. Direct drive could be used much more of the way if the surface were not so rough.

A six-mile low-gear climb through beautiful mountain scenery, over rough stony surface, brought us to the summit of the first mountain, Laurel Ridge. Springs are numerous along the ascent, and the chestnut groves, the clumps of rhododendrons and the profusion of ferns and wildflowers proved so tempting that when we came to Chalk Hill, two miles beyond the summit, we ran the machine into a barn and enjoyed the mountains until evening. A good supper, a moonlight stroll on the mountains, the call of the whippoorwill, the gorgeous sunrise next morning and the delicious morning air, were all so delightful that it was not until afternoon that we wended our way eastward past Braddock's grave and Fort Necessity, to Somerfield (Smithfield on the mile-posts), where the pike crosses the Youghiogheny on a beautiful succession of stone arches erected in 1818.

This and other bridges show governmental thoroughness of structure. They stand to-day practically as good as ever, after nearly a century of neglect. The copings have been loosened by frost in some places, owing to neglect of "pointing," but the arches of all seem solid. Good fishing (bass and speckled trout) and small game shooting are told of near Somerfield. We pushed on into Maryland, through Addison (Petersburg on the mile-posts), and up Winding Ridge to Keyser's Ridge, where we found most excellent accommodations over a general store. Better meals, cleaner





AN ABANDONED TOLL HOUSE ON THE NATIONAL TURNPIKE IN PENNSYLVANIA

linen, or more genial, pleasant hosts, we never met. Their kindness that night on the lonely mountain will be long remembered. They predicted rain on the observation that the cabbage had wilted and that the cats were playing. It rained.

The next morning the sun rose in a clear sky, and we enjoyed the early morning ride through the wooded ascents, lined close to the road with ferns and wild flowers. How any man with a soul could name this paradise Negro Mountain, is more than I can understand. The soil there is sandy, without clay, consequently the road was at its best in spite of the rain during the night.

A rather barren meadow covered with rotten stumps marks "Shades Mill." There is neither mill nor shade now, but the original name was "Shades of Death" because of dense, dark overhanging pine and hemlock trees. But it was commonwealth land, and a pirate sawmill came along and soon only a stretch of blackened stumps marked the spot.

About nine miles west of Frostburg at Stone Farm is a stonewall inclosure, now used as a cemetery, 500 yards north of the pike. A native told us it was "Braddock's Fort," although historic corroboration seems to be lacking.

The next mountain beyond the Negro is Meadow Mountain, and from there on over Little Savage and Big Savage, the worst stretch of road on the pike is encountered. Just over the summit of Big Savage a beautiful valley spreads out, with Frostburg nestling among the undulating meadows. A good coast is spoiled by the rocky roughness of the road.

Leaving Frostburg, eleven miles of smooth surfaced down grade takes the tourist through a grand rock-faced notch in the mountains, through which Will's Creek flows, and on into Cumberland. Just before crossing the bridge a depot of the Standard Oil Company affords the only gasoline supply to be had after leaving Uniontown.

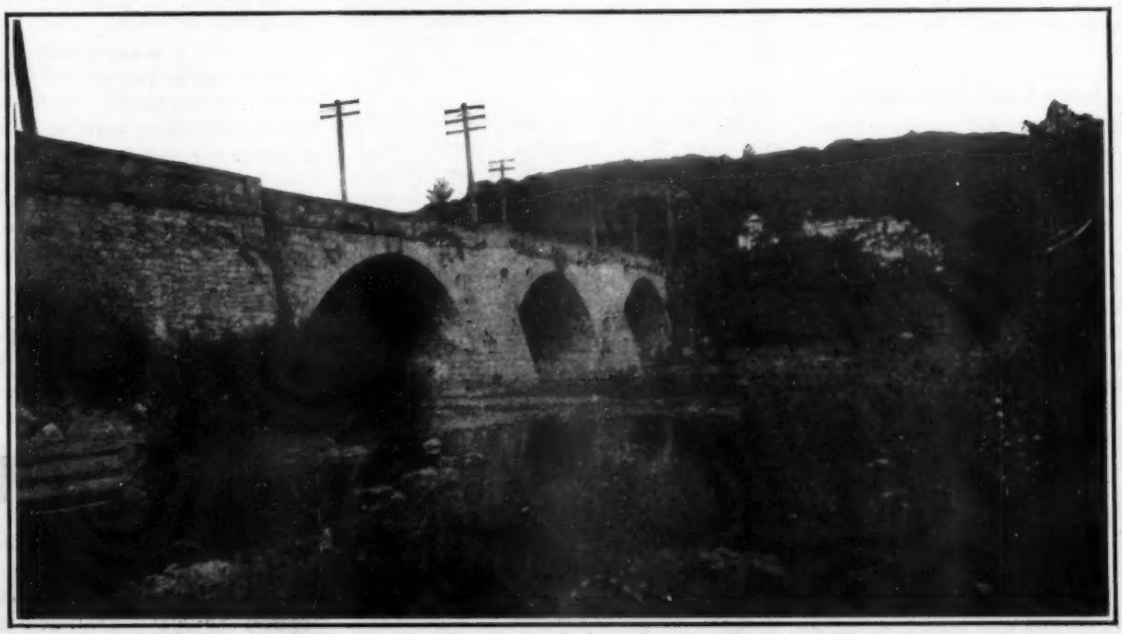
The temptation to push on eastward was almost overpowering, but we put it behind us by heading the car westward, and climbed again the seven mountains, recrossed the Youghiogheny and the Monongahela, and wended our way back along the "old pike" to Beallsville, where we turned north toward a smoky pall hanging in the sky over Pittsburg, thirty-two miles away. Three miles of macadam road brought us to Bentleyville. Thence over wretched clay roads, through Ginger Hill and Finleyville to Library, where a newly macadamized road twelve miles in length brought us quickly out on the Knoxville hilltop, from from which the powerful arc lights could be seen dimly through the smoke, far below, in seething, sizzling, grimy, black, smoky but prosperous Pittsburg.

Having come that day from the blue, thin, crisp air of the Allegheny mountains, we could not help thinking,

"Ye who enter here, leave all hope behind."

Down into the cauldron we coasted, and our holidays were ended.

In the course of a case in an English court the other day one of the counsel said there were four speeds at which motorists traveled. They were: (a) The speed the policeman said; (b) the speed the chauffeur told the magistrate; (c) the speed the chauffeur told his friends in a public house, and (d) the real speed.—Kansas City *Journal.*



STONE ARCH BRIDGE ACROSS THE YOUGHIOGHENY RIVER AT SOMERFIELD, PA., BUILT IN 1818.

Letter Box

Prejudice in the Courts.

Editor THE AUTOMOBILE:

[283.]—I do not believe it is possible for the owner of an automobile to secure compensation for damage to his car from any jury in this part of the country. Mr. Rushmore's case, related in the October 26 issue of your journal, is on a par with one just decided against me, October 19, 1905, by a New York City court.

In June, 1905, my car was being demonstrated in New York City by my mechanic for a prospective customer. While crossing West One Hundred and Eleventh street and Amsterdam avenue a north-bound trolley car hit the front end of my car and threw it around in front of a south-bound trolley, grinding it into a shapeless mass between them. We proved that our car was traveling at the slow speed of four or five miles an hour when crossing the tracks, and that the north-bound trolley was going so fast that it could not stop until it reached the opposite side of the road, and to any unprejudiced mind it was clearly the fault of the nineteen-year-old boy who was speeding his trolley.

We had much difficulty in selecting a jury, four or five men declaring boldly that their prejudices were too great against autos to render a fair decision. Of course we could not challenge the judge himself; but his charge to the jury showed where he stood on the subject when he said: "If the auto got in the way of the south-bound trolley it was guilty of contributory negligence, and you must find for the defendant." And this, in spite of the evidence that the north-bound trolley knocked or forced it in the way of the south-bound car.

R. G. DUBOIS.

New York City.

Another Jersey Legal Experience.

Editor THE AUTOMOBILE:

[284.]—In your issue of October 26 appears a letter from Mr. Rushmore in which complaint is made of the treatment received in a New Jersey court. The writer of this communication has just received a favorable decision in an automobile suit, which decision was rendered by the same judge who decided Mr. Rushmore's case. I was arrested on May 30, 1904, in the outskirts of Chatham, N. J. The constable was a very unprepossessing looking individual who held a club in one hand and a pistol in the other as he stood out in the middle of the road in front of my machine. We went before the justice, who, in a very good-natured way, imposed a fine of $10 on the ground that my speed exceeded a mile in eight minutes.

On the same day and hour another automobilist was arrested by another constable, but the justice said he was in doubt about him, so he let him off with a fine of $5, a very curious way of expressing doubt on the part of a supposititiously judicial officer.

Both cases were at once taken up on certiorari proceedings, being placed in the hands of eminent counsellors, and on October 11, nearly seventeen months after the arrest, the judgment of the country justice was set aside and reversed by Judge Fort. Meanwhile, I have a suit against the constable for false arrest going on, whose prosecution has depended on the decision in the certiorari suit.

I think that the bringing of these two suits had a good effect in preventing the arbitrary arrest of other automobilists by the village of Chatham. This was all under the old law. It does seem possible that the recent arrests in New Jersey might be worth contesting. What the future may bring forth is hard to say, but I think it will be of interest to carry these cases of mine to a finish, and I intend to do so.

T. O'CONOR SLOANE.

South Orange, N. J.

Chain Drive in Cup Race.

Editor THE AUTOMOBILE:

[285.]—In your issue of October 26, I noticed a letter by Mr. W. H. Workman, of the Packard Motor Car Company, headed, "Shaft Drive in Cup Race." In this connection it might be stated that the Italian car which made by far the most wonderful exhibition in the cup race was equipped with a double chain drive. This probably proves nothing in favor of the chain transmission, as the skillful and fearless Lancia would undoubtedly have made a similar record with a gear-driven machine if the parts were in good proportion and backed up by a sufficient amount of power.

Both the chain and bevel gear methods of transmission have given our manufacturers and users a lot of trouble, but step by step the difficulties have been eliminated until both styles have made records we may well be proud of.

The Packard touring car, with its bevel-gear drive is a recognized success, and I believe their other production, the commercial car, with its double chain drive is also a success.

I have been told that a certain American racing car which the makers wished to enter in the cup race was found before the elimination trials to be considerably over weight, but they brought same to a point well under the stipulated weight by abandoning the gear drive and replacing it with the double chain. If this is true, it would indicate that the double chain transmission gives greater strength with less weight, and this point should not be passed unnoticed.

A number of years ago our automobile manufacturers equipped their steam cars with bicycle chains and then added extra seats for additional passengers without increasing the size of the chain. This gave the chain drive a "black eye" from the very start, but, notwithstanding the fact. I believe about 80 per cent. of the cars are chain driven at the present date.

The chain and sprockets used on practically all of the earlier model gasoline cars were not correct and suitable for the purpose, and most of the chains were damaged by interference, as but few manufacturers allowed sufficient space for chain clearance. When it was found that chains were not heavy enough for the severe duty, it was in most cases impossible to remedy the difficulty by supplying larger or heavier chains on account of the limited space provided. When the gear drive was presented it was welcomed by many who had been annoyed with chain troubles, but later on many of them were equally disgusted with bevel gear troubles and difficulties with universal joints, thrust collars, weak rear axles, limited power, etc.

Certain manufacturers made their own sprockets and evidently assumed it was only necessary to mill in same the correct number of teeth. If the sprockets were not the right width, not cut to the correct bottom diameter, teeth too straight on the sides and irregularly spaced, sprockets out of line, etc., it was supposed to make but little difference. When some of the same manufacturers commenced to experiment with the gear drive they were obliged to purchase their gears from manufacturers who were expert in this line, and it was necessary to pay a high price for the quality and accuracy required to insure the gears revolving. If bevel gears were cut in the manner some sprockets have been, the result would be astonishing.

I believe both the shaft and chain drive at present on many cars are a success, but imagine the chain will be by far more popular in the future for the following reasons:

Less weight.
Less friction.
Lower cost to manufacture.
Lower cost to repair.
Less time to repair.
Ease of changing gear ratios to suit road conditions for various parts of the country.
Saving on tires by less weight.
More reliable rear axles for rough roads and heavy loads.
In case of an accident, the chain driven car may be pushed off a railroad track or from the center of a road..

W. E. C., Advertising Dept.,
THE WHITNEY MFG. CO.

Hartford, Conn.

What Individuals Can Do to Secure Better Streets and Roads.

Editor THE AUTOMOBILE:

[286.]—I mail you two copies of the Niagara Falls *Record*, just to show you what one enthusiastic automobilist can do in most towns and cities, if he tries, towards putting bad roads into good condition.

Permit me to suggest to all automobilists

in favor of good roads to get up a good roads association (not an automobile club, as people are generally antagonistic toward automobilists). Remind all drivers of horses of the advantages of good roads, agitate the matter before your city aldermen, extend the movement out into your townships and counties, and in a short time a decided improvement will be made in your roads and it will be a pleasure to drive.

I own three automobiles, and it is very aggravating to go out for a ride over some of the poorly kept, neglected roads in this district. Agitate until you get the roads put in first-class condition. W. W. D.

Niagara Falls.

The first of the papers sent contains a report of a good roads meeting called at the instance of our correspondent and held in the city hall in Niagara Falls, Canada. It was an interested gathering of more than 100 persons, including business and professional men and several aldermen. William L. Doran, who was called to the chair, outlined the objects of the association he proposed to organize, spoke of the benefits likely to be derived from the boulevard proposed to be built between Lakes Erie and Ontario by the Niagara Falls park commission, and said this work should be supplemented by good roads and streets in the city. After a discussion of the wretched condition of the streets, the reasons therefor and the remedy, the chairman appointed a committee to draft a platform and the meeting adjourned.

In the second copy of the paper was published the outline of the purpose of the association formed, which is to prevail upon the municipal council, individually and collectively, to enter into a more detailed and comprehensive plan for the care of the roads, as a matter of economy and progressiveness. Nine suggestions as to ways in which the streets should be cared for were added, and a memorial from the "Good Roads Association of Niagara Falls" reminded the Ontario government, the park commission and the member of parliament for the district of the need and desirability of expediting the construction at the earliest possible date of the proposed boulevard along the bank of the Niagara river from Fort Erie to Niagara. The paper also reported the resolution to send a copy of the memorial to the municipalities of Fort Erie, Bridgeburg, Black Creek, Queenstown and Niagara, requesting their earnest coöperation.

Crankshafts and main bearings were discussed at the November meeting of the Mechanical Branch of the Association of Licensed Automobile Manufacturers, held at the A. L. A. M. headquarters at 7 East 42d street, New York, on Wednesday, November 1. Each engineer exhibited drawings showing his methods of construction and gave dimensions, material used, pressure on bearings, methods of lubrication and so on.

Interesting Week-end Run from Detroit.

DETROIT, Mich., Nov. 6.—One of the interesting week-end tours for automobilists of this city is the run to Port Huron, at the foot of Lake Huron. The trip can be made easily in four or five hours, and if the right route is chosen the ride will be a most enjoyable one.

The oldest resident, the stage-coach driver and the farmer, one and all, if asked for directions will tell you to "go straight up Gratiot road." This is the shortest route, it is true, but it is not the best by any means. Gratiot road is one of the old stage roads of the state, and is therefore widely known. It is fairly good for perhaps half the distance, but the heavy sand in places near Port Huron causes the motorist to forget all the good road he has ridden over. The distance by the Gratiot road is sixty-one miles, but much the better going is over the "shore road," which is only six or eight miles longer. This road, skirting St. Clair lake and St. Clair river, offers splendid vistas of scenery, and the eye is delighted with the ever-changing view.

Starting from "automobile row" on Jefferson avenue, Detroit, the route is as follows: To the entrance to Belle Isle, turn left opposite Electric Park and follow Grand Boulevard to the high school building on the right; turn right here, following car tracks on Mock avenue to the end of the line; keep straight ahead over a fine, wide macadam road about four miles to a big sign reading "Dobson Frog Dinners"; turn right and follow gravel road to Grosse Pointe, turn sharp to left at the postoffice, and the next few miles is along the river bank, where the view is beautiful. The river to the right, with the shores of Canada in the distance, and the huge steamships and smaller vessels plying the magnificent waterway, elicit admiration, while the beautiful homes of the Grosse Pointe "farmers" on the left of the road make a charming contrast.

The St. Clair township line, fourteen miles from Detroit, brings an end to the macadam and gravel, the remaining eight miles to Mt. Clemens being part clay and part sand road. This road is good, however. Follow the trolley here, direct to Mt. Clemens.

Leave Mt. Clemens on Gratiot road and follow trolley to Chesterfield, seven miles. The road forks just after crossing the railroad switch. The left-hand road is the short route to Port Huron—thirty-two miles from Chesterfield—but don't take it. A red brick house on the right at the forks is a landmark. Turn right here and follow trolley to New Baltimore, ten miles, cross trolley at outskirts and keep straight ahead into town; pass Chesterfield Hotel on right, also creamery and powerhouse on right, and follow trolley to Anchorville, three miles; turn left to first road, half a mile, turn right one mile, turn left a half mile to church, turn right five miles to end of road; here turn left a quarter mile, turn right to jog in the road, then straight ahead on Chertier road (fine gravel) two miles to Marine City.

At the river in Marine City turn left and follow river road eight miles to St. Clair; continue on river road twelve miles to Port Huron. This road is mostly gravel and offers good driving.

At Port Huron the first objective of automobilists is Yokom's garage, one block to the right just before crossing the river. This is the only garage in town. George Yokom, the proprietor, is a relic of bicycle days, and he still has his office walls decorated with pictures of bicycle stars. Yokom and J. D. Patterson, the jeweler on Military street, are the road authorities of Port Huron, and any information desired may be secured from them.

The following route is suggested by Mr. Patterson as being the best by which to return to Detroit, and investigation proved him to be right:

Leave Port Huron on Military street, go south three miles to Ravenswood; turn right, passing square house on hill at left opposite schoolhouse; follow fine macadam road three miles, then straight ahead over dirt road three miles to Pine river iron bridge; cross bridge, turn right across railroad track, then turn left. Follow this road four miles, down 10 per cent. grade, across bridge, up 10 per cent. hill, to end of road, one mile; turn left a half mile; turn right over gravel road, three miles; cross railroad track, turn left and cross track again; then follow angling road, and pass schoolhouse on left; continue straight ahead to end of road, two miles, turn right down hill across bridge, go two miles, turn left at telephone poles and follow poles three miles to Richmond. Continue straight ahead, passing through Lenox, one mile, to end of road, one mile; turn right at blacksmith shop onto Gratiot road. This point rejoices in the name of "Muttonville," and the roadhouse here provides gasoline for the car and refreshment for the man.

From Muttonville follow Gratiot road to Mt. Clemens, sixteen miles, and continue on same road to Detroit, twenty-two miles—or take the shore road.

The "Patterson route" is sixty-nine miles long, but the road is good all the way, and it can be driven in less time than the sixty-one miles over the Gratiot road.

Dr. P. A. Pearson's new auto arrived Monday. After a little practice the doctor will be quite expert at running the machine. He created a good deal of excitement Wednesday morning by trying to run into Marsh & Bidwell's side door. Frank Kettleson was standing in the door at the time, and was thrown into hysterics, but soon recovered.—Lewis (Kan.) *Press.*

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Automobiles in Practical Politics.

In watching the growth of automobilism, nothing is more interesting than to note the adoption of the machine in new fields of usefulness as a necessary instrument especially by those whose interest is aroused merely by the utility of the machine. It is in this way that the automobile has come into practical politics outside the legislative halls. As an aid to the political campaigner, the automobile has become indispensable, not only in the rural districts, but in the large cities also. This has been shown more markedly than ever before in the municipal campaign in New York City, just closed.

Under the old order of things, the candidate for office was limited in the number of addresses he could deliver, not so much by his own powers of sustained oratory, as by the radius of action and speed of the horse-drawn vehicles which he employed. The physical limitations of the older method of transportation have suddenly been removed by the automobile, and now the time and place no longer set the limit to the politicians' public appearances, but rather his powers of oratorical endurance. For example, one candidate for the office of Mayor of New York drove more han fifty miles in the space of an evening, making eight stops for addresses to constituents at various points lying between the heart of the city to a suburban town several miles distant. And that is only a sample, for other candidates used their automobiles nightly, and were thus able to present themselves at many different points which they would have been unable to cover by any other means of locomotion on the nights preceding the election.

It is such practical demonstrations of the everyday usefulness of the automobile that make for progress and give many thoughtful persons a real interest in the latent possibilities of a machine that is too often viewed as a mere instrument of pleasure. It is that and something more—very much more.

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Adjustments on New Machines.

One of the things that the purchaser of a new automobile should not do, but usually does, is to readjust everything adjustable as soon as the machine is in his hands. The temptation to try to make the car "run a little better" seems almost irresistible, especially to mechanically inclined persons, and the result is too frequently a haphazard turning of adjusting screws without any definite notion of what is wanted or what the result will be. It is true that on a new machine adjustments are sometimes necessary, but as a rule this is not the case, and a little consideration of the facts will show why.

It is greatly to the advantage of the automobile manufacturer to have his cars run well; and to do this they must be accurately adjusted. The large manufacturer selects from among his employees men who are especially skilled in making adjustments and assigns to them the work of testing the finished machines and putting them in good running order. In an establishment of any magnitude the adjusters will test and tune up a great many machines in the course of a year and will become very expert in their particular work. Doing nothing but test and adjust a single type of mechanism, it is easy to conceive that even a man of only moderate intelligence would soon be much better able to do this work than the most expert mechanic whose knowledge and experience were of a general character. Even if the owner of a car has had some experience with that particular machine, he can hardly feel capable of assuming that his ability to make adjustments is equal, not to say superior, to that of the specialist whose whole time is devoted to doing the one thing and whose livelihood depends upon his doing it well.

It is conceivable that if a machine is to be used under special and unusual conditions some alteration of adjustment may tend to increase its efficiency under the circumstances, because adjustments are made with a view to producing the best all-round results. Also, adjustments are sometimes accidentally disturbed. In the first case the man who knows what he wants and how to do it is justified in making the change, understanding that what he gains in one direction he may lose in another; and in the second case adjustment is, of course, essential. In the great majority of cases, however, it is much the wiser course to leave things alone until sure or reasonably suspicious that something is wrong, and even then to make no changes without knowing what to do, how to do it and why it is necessary.

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Aero Club of America.

The pioneers in the problem of aerial navigation are certainly enjoying a more lively public interest and appreciative support than those who were the originators of automobile locomotion. Familiarity with the use of highly specialized and refined mechanism in motor car construction has done much to provide what are perhaps the crude beginnings of mechanical flight. Such mechanisms give ready to hand sources of energy that the early pioneers in automobile construction never even imagined possible.

Popular and scientific interest in the newer problem is helpful in providing capital for experimentation and opportunities in which the present result of failure does not create a belief that the problem is impossible of solution. The formation of the Aero Club of America in New York is a manifestation of the spirit referred to. It has been organized in all seriousness to aid in the development of invention and the accumulation of scientific data, and its list of founder members shows support from a wide diversity of commercial and private interests.

When road travel by automobile was as immature as the flying machine is to-day, there was no supporting club to foster the new form of road transportation. It is true that this support came early, long before maturity was reached, but there were practical road vehicles in operation before the Automobile Club of America came into existence. The organization of that club did more for the serious development of the automobile than any one other agency. It is the intention of the Aero Club to give similar support to the advancement of areonautics, and doubtless the membership will soon include those Americans who have done much serious work in this field, and whose names are familiar in scientific circles throughout the world. There is certainly a splendid field of usefulness for such an organization.

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The recent decision of leading American steel makers to produce special steels for automobile construction is an encouraging sign of progress. The growth of the industry has made the builder's orders worth the serious attention of the steel maker. The excellence of the productions of certain French and German shops is perhaps due more to the co-operation of the metallurgist than to any other cause.

Roberts Breaks Five-Mile Record at Philadelphia.

PHILADELPHIA, Nov. 6.—Promoted on short notice, last Wednesday's race meet of the Philadelphia Automobile Dealers' Association at Point Breeze track was the most successful ever held in this city. It was the only affair of the kind held here this year. There were in attendance 2,500 persons, and nearly 300 machines were parked near the grand-stand.

Despite a northwest gale, the racing was excellent, the track records for one to five miles, formerly held by Barney Oldfield, being broken by Mortimer Roberts in his 60-horsepower Thomas Flyer. His time for the five miles was 5:11 3-4 (the timing was done by horse-racing men) as against Oldfield's 5:28 3-5.

Roberts also annexed the five-mile free-for-all, in which the majority of the winners of the other races started, including Mrs. Cuneo, in her White steamer, who had rather easily disposed of her field in the three-mile special race for cars selling at $1,500 to $2,500. Roberts played with his field and did not let out the Thomas until the beginning of the fourth mile. His time was 6:11. Mrs. Cuneo brought her White across the tape in third place, being beaten for second place by Phil Kirk in a 35-horsepower Apperson. Later a special two-mile race between the Apperson and the White was put on, and again Mrs. Cuneo was compelled to take her opponent's dust.

While there were no very serious accidents a spectator had his leg hurt by one of the cars after the finish of a race. He had strayed out on to the track from the gate and was knocked down by a car, both bones in the lower leg being cracked.

Following is a summary of the afternoon's racing:

Two miles special, runabouts.—W. David, 8-horsepower Maxwell, 1st; F. Smith, 8-horsepower Maxwell, 2d; Dr. Ferguson, Autocar, 3d. Time, 4:26 3-4.

Two miles special, cars valued up to $1,500.—E. Wilkie, 22-horsepower Buick, 1st; A. C. Harmer, 16-horsepower Elmore, 2d; C. B. Cleaver, 18-horsepower Rambler, 3d. Time, 3:10.

Three miles special, cars from $1,500 to $2,500.—Mrs. Cuneo, 18-horsepower White, 1st; C. W. Rowe, 24-horsepower Searchmont, 2d; A. B. McGowan, 15-horsepower White, 3d; W. M. Swain, 24-horsepower Winton, 4th. Time, 4:08.

Three miles special, cars from $2,500 upward.—Phil Kirk, 35-horsepower Apperson, 1st; S. Dexson, 20-horsepower Speyker, 2d; P. Wostenholme, 24-horsepower Peerless, 3d. Time, 3:59 1-2; F. LaRoche, 24-horse-power Studebaker, disqualified.

Two miles special, 18-horsepower Rambler cars.—Paul B. Huyette, 1st; L. C. Vogel, 2d; Thomas Roberts, Jr., 3d. Time, 3:34.

Two miles special, 16-horsepower Maxwell cars.—Charles Heinze, 1st; W. Longstreth, 2d. Time, 3:35.

Free-for-all, five miles.—Mortimer Roberts, 60-horsepower Thomas Flyer, 1st; Phil Kirk, 35-horsepower Apperson, 2d; Mrs. Cuneo, 18-horsepower White, 3d. Time, 6:11.

Two miles special, 16-horsepower Elmore cars.—W. Swain, 1st; A. C. Harmer, 2d; H. P. Stoey, 3d. Time, 3:48 1-2.

Special match race, two miles.—Phil Kirk, 35-horsepower Apperson, 1st; Mrs. Cuneo, 18-horsepower White, 2d. Time, 3:53.

Special match race, five miles.—Walkover for C. W. Sprague's 22-horsepower Buick, Harry D. Edwards' 16-horsepower Reo having failed to appear. Time by miles, 1:33, 3:05, 4:35, 6:07, 7:37.

Time trial for Autocar, two miles.—Time, 3:32.

Trial for track record, five miles, 5:28-3-5, held by Barney Oldfield.—Mortimer Roberts, 60-horsepower Thomas Flyer. Time by miles, 1.02 3-4, 2:06, 3:08 1-4, 4:10 3-4, 5:11 2-4.

INDIANAPOLIS RACE MEET.

Clemens Wins 100-Mile Race in Record Time in a National.

INDIANAPOLIS, Nov. 4.—In the 100-mile race, the feature of the meet held here today under the auspices of the Indianapolis Automobile Racing Association, W. F. Clemens, an Indianapolis driver, in a 1906 National car, broke the track record for that distance. His time was 1h. 53m. 21 2-5s, or almost five minutes better than the best previous record made in competition. The track was a one-mile oval.

Of five entries but two cars finished, Ray McNamara, in a Premier, being second, more than half an hour after Clemens had finished. The other starters were Fred Tone, driving a Marion; Charles Merz, in a National, and Frank Moore, driving a Maxwell.

The Marion had tire troubles after twelve miles had been run and dropped out. Shortly afterward the Maxwell dropped out, leaving the two Nationals and the Premier in the race.

In the eightieth mile Merz stopped a few minutes for tire repairs. Up to that time he had been running on even terms with Clemens. On a turn in the ninety-fifth mile the big National crashed into a fence, as a result of one of the rear tires bursting. About ten yards of the fence was torn down, and one of the front wheels of the car was broken.

An interesting feature of the program was an exhibition five miles by Carl G. Fisher in his 100-horsepower Premier racer built for the Vanderbilt race. Although Fisher did not break any records, he reeled off five miles at the rate of a little less than a mile a minute, or in 5:05 3-5.

The closing event was the five-mile handicap for cars selected by the judges on their performances to go against the Premier racer. Fisher in the Premier started at scratch, the two Nationals were each given a handicap of 55 seconds, and the Premier touring car 1m. 18s. The event was bitterly fought, but Fisher overtook the other cars one by one, and in the home stretch in the last mile won by a yard from Merz in a most sensational finish.

The meet was pronounced to be the most successful ever given in Indianapolis, despite the fact that it had been postponed six times because of unfavorable weather. The track was remarkably smooth and was in shape for record breaking. Fall races will probably be run annually in the future.

EAGLE ROCK CLIMB IN DOUBT.

NEWARK, Nov. 4.—Although a committee of automobilists, some of whom are connected with the Automobile Club of New Jersey, under whose auspices the Eagle Rock hill climb has heretofore been held, and others from the New Jersey Automobile and Motor Club, has been appointed to make arrangements for the event this fall, it is being said by certain automobilists in a position to know that the contest may not be held this year, owing to the fact that Charles H. Gillette has removed from East Orange to Hartford. Mr. Gillette has always been the leading spirit in organizing and conducting the contest in the past. Local automobilists want the contest held as usual. The residents living in the vicinity of the course are in favor of it, and it is thought that the Essex county freeholders will grant the use of the road for the purpose if the request is made.

HAD NO TIRE TROUBLE.

The report that the Christie car had tire trouble in the Vanderbilt cup race appears to have been erroneous. Reports gathered from all around the Long Island course by the Diamond tire corps show that Walter Christie had no delays on account of tires, and this is supported by Mr. Christie in a letter to the Diamond Rubber Company, reading as follows:

"I noticed in some of the news reports that I had tire troubles during the Vanderbilt race. This I beg to contradict, as I had no tire trouble whatever. My only delay was caused by overspeeding my motor the night before the race, which broke a connecting rod and crippled me badly, or you would have seen your tires making some fast time on my car."

NEWS NOTES OF THE CLUBS.

The regular annual meeting of the Automobile Club of America will be held at the club rooms, 753 Fifth avenue, New York, on Monday evening, November 20, when officers for the ensuing year will be elected. The following nominations have been made by the Board of Governors:

For president, Dave H. Morris; for first vice-president, Colgate Hoyt; for second vice-president, Frederick G. Bourne; for third vice-president, Clarence Gray Dinsmore; for treasurer, W. S. Fanshawe; three governors to serve for three years each, Col. John Jacob Astor, George F. Chamberlin and Schuyler Skaats Wheeler; for one governor to serve one year, John E. Borne; for one governor to serve two years, William Pierson Hamilton.

The Aero Club of America, formed by about seventy members of the Automobile Club of America, as already reported, intends to take up the study of aerial navigation in a serious and scientific manner. Though none of the members are present owners of balloons, aeroplanes or apparatus of a similar nature, the club will commence arrangements for the acquirement of these and other things necessary to the study as soon as the work of organization has been completed. For the present the club headquarters will be at the rooms of the A. C. A., and S. M. Butler, secretary of the Automobile Club, is also secretary of the new club. A meeting will be held at an early date and the organization of the club completed; at the same time a number of applications for membership will be passed on, and these will probably bring the total membership over the limit of 100 set for the founder membership.

WORCESTER.—The Worcester Automobile Club secured new quarters last week. A lease was signed whereby the club will have the use of four rooms, or half of the top floor, of the Chase Building on Front street. The new quarters are in the heart of the city and will be furnished elaborately. They are to be in readiness by the first of December, when it is thought all the alterations will have been completed. A meeting has been called for Tuesday night, as it is planned to incorporate the club. Efforts are to be made to increase the membership and to make the club more of a social organization.

Officers Re-elected by the Selden Association.

The annual meeting of the Association of Licensed Automobile Manufacturers was held at the association's headquarters, 7 East Forty-second street, New York, on Wednesday, November 1, and officers for the coming year elected. The result was the re-election of the present officers, as follows:

President, Charles Clifton, of the George N. Pierce Co., Buffalo; vice-president, William E. Metzger, Cadillac Automobile Co., Detroit; secretary, L. H. Kittredge, Peerless Motor Car Co., Cleveland; treasuerer H. H. Franklin, H. H. Franklin Manufacturing Co., Syracuse; executive committee, Charles Clifton, F. L. Smith, Olds Motor Works; E. H. Cutler, Knox Automobile Co.; S. T. Travis, Jr., Locomobile Co., of America; M. J. Budlong, Electric Vehicle Co.

The manufacturing and importing license held by the Worthington Automobile Company of New York was bought back by the association, the Worthington company, which is taking up the manufacture of steam automobiles, ceasing to be a member. The Royal Motor Car Company of Cleveland was admitted to membership, agreeing to pay royalties on all cars manufactured since January 1, 1903.

The newly incorporated Association Patents Company reported that active work on patent interests of members had been commenced. The show committee reported that all space for exhibits in Madison Square Garden had been allotted.

LOCAL SHOW SANCTIONS.

Manufacturers' Association Takes Action Regarding Those for 1906.

Sanctions for local shows to be held during the coming winter will be limited to cities in which shows were held last winter, according to a decision arrived at during a meeting of the executive committee of the National Association of Automobile Manufacturers held in New York on Thursday, November 2. It was also decided that the proceeds of local shows must go to local dealers' organizations; local organizations must admit to membership all reputable dealers who have been in the same business for at least one year, and local organizations of dealers must not call upon the manufacturers they represent for financial assistance in the conduct of exhibits.

Contrary to an impression that had got abroad, the Association does not expect to sanction road contests, although it may take the details of such contests into consideration and make recommendations to its members.

The test case brought by the association for the purpose of testing the validity of the licensing feature of the New Jersey law came before the Court of Common Pleas in New Jersey on Wednesday, November 1, but no decision has been rendered. It is expected that an appeal will be taken, no matter what the decision may be.

GREAT DEMAND FOR SHOW SPACE.

Applications for space at the Chicago show so largely exceed the space available that there will necessarily be some delay in announcing the allotment. All space in the gallery set aside for accessories has been allotted by the Motor and Accessories Manufacturers' Association. There are eighty-seven applications for space in the complete cars section, applicants desiring to exhibit 368 cars and applying for 224 spaces, aggregating 62,845 square feet. As there are only 131 spaces available, aggregating 39,497 square feet, the difference must be adjusted. The scheme of building an extra gallery was abandoned on account of the danger of fire, owing to the large amount of lumber required for the work.

AUTO STAGES IN ILLINOIS.

YORKVILLE, Ill., Nov. 4—Officers of the Joliet, Plainfield and Aurora electric road, who are also interested in automobiles, have resolved to put a line of fourteen-passenger auto coaches on the highway between Yorkville, Plano and Sandwich, a distance of about fifteen miles.

Yorkville is reached by the Yorkville line of the Elgin and Aurora and Southern electric road, and it is planned to meet the cars of this line at Yorkville and make the run to Plano and Sandwich in the autos. The coaches will be enclosed and heated. A thorough test will be made, and if the experiment pays, an electric line will be built. The wagon roads are good between the points named.

An auto coach line has been established between Hinckley and Sycamore, in DeKalb county, and the venture is paying well.

NEWS AND TRADE MISCELLANY.

The Bennett-Bird Company has secured the Chicago agency for the Corbin car.

L. J. Oliver, heretofore connected with Devlin & Co., Chicago, has taken the position of manager of Ralph Temple's store.

The Mason-Kipp Manufacturing Company, of Madison, Wis., has changed its name to Madison-Kipp Manufacturing Co., and has recently enlarged its plant.

Harrington's Automobile Station in Worcester, and C. K. Smith, of New London, Conn., recently renewed their contracts with C. S. Henshaw to handle the Thomas next year.

B. G. Koether, former purchasing agent of the Hyatt Roller Bearing Co., of Harrison, N. J., has left the purchasing department to become assistant sales manager of that concern.

N. Snellenburg & Co., the big Philadelphia department store owners and clothing manufacturers, are experimenting with a Studebaker electric truck, with a view to equipping their heavy hauling department with several vehicles of this make.

C. W. Kelsey last week relinquished the management of the Philadelphia agency for the Maxwell cars and assumed the duties of general sales manager for the Maxwell-Briscoe Motor Co. at the factory at Tarrytown, N. Y. William P. David succeeds Kelsey as manager of the Philadelphia agency.

A concern recently organized in Chicago under the name Kelly, Hunt & Co., has taken the Northern agency, and after February 1, 1906, will occupy the present quarters of the McDuffie Auto Company, which will move into the new building now being erected to the south of the present one.

The Auto Body Company, of Lansing, Mich., has broken ground for an addition that will double its present capacity. The addition will be of brick and two stories high, in the rear of the present plant. Besides the new building for manufacturing purposes, a new steam plant will be constructed.

The Hayden Auto Company, of Chicago, which has been handling the National, Marion and Monarch cars, is to go out of business, the National agency going to Ralph Temple. Tom Hay, of the Hayden company, will assume the management of the new Chicago branch of the Ford Motor Car Company.

The Lansing, Mich., agency for the Reo has been given for 1906 to Daniel J. Wurges and Frank A. Wall. The agency includes six and a half counties in central Michigan. Messrs. Wurges and Wall have already effected arrangements for the construction of a thoroughly modern all-day and all-night garage and repair shop in the central portion of Lansing.

The manufacturers of the Gabriel horn have sent out to the trade a circular letter announcing that the Gabriel horn is protected by letters patent of the United States No. 802,386, issued October 24, 1905, and that other patents thereon are pending in the United States Patent Office. The letter also calls attention to the fact that the word "Gabriel" has been registered as a trademark.

The new Paris agent for the Olds Motor Works has sent in his first order, which was for seventy-five machines, including two-cylinder and four-cylinder cars and single cylinder runabouts. Besides these the Olds Company has shipped a consignment of automobile goods for the Paris automobile show, which opens December 8. Another consignment has been shipped for the London show, to open November 17.

It is announced by the A. L. A. M. that W. J. Moore, defendant in the injunction proceedings brought by the association, who was supposed to be dead, is very much alive. He was served with the injunction of the Federal Court in Albany a few days ago while in the Ten Eyck hotel. It will be recalled that the suit brought against him by the licensed association was not defended and the court granted the prayer of the complainant and enjoined Moore from using any car that constituted an infringement of the Selden patent.

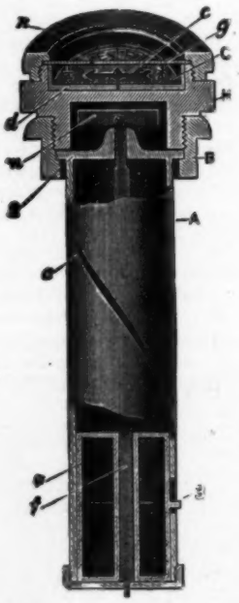
When the two new additions to the C. H. Blomstrom Motor Company's plant at Clark avenue and River street in Detroit are completed, the manufacturing capacity of the company will be increased to three times the present capacity. Two brick buildings, one 290 by 50 feet and the other 150 by 50 feet, are rising rapidly, and the smaller one is expected to be ready for occupancy by November 16. Each building is to be two stories in height and will be used primarily for assembling the machines. The machine shop will remain in the old building. The capacity will be increased to 1,500 cars a year and the improvements are expected to cost about $25,000.

C. A. Benjamin, sales manager of the H. H. Franklin Manufacturing Co., of Syracuse, is making an extended western trip. While in Chicago he will make final arrangements for the handling of the Franklin cars in that city. The following agencies for the Franklin cars are announced: On the Pacific coast and in the Rocky Mountain States, L. L. Whitman; in Southern California, R. C. Hamlin, of Los Angeles; in San Francisco, the Franklin Automobile Agency, under the management of Gus Boyer; in Boston, A. R. Bangs; in Philadelphia, the Quaker City Automobile Co.; in Pittsburg, the Standard Automobile Co.; in New York, the Decauville Automobile Co., and in Washington, Cook & Stoddard.

The Autocar agency in Providence, R. I., which has been in the hands of the Thomas & Lowe Machinery Co. for the past two years, will be controlled by A. S. Hitchcock and G. H. Brown.

INFORMATION FOR BUYERS.

TRIUMPH GASOLINE GAUGE.—One of the little things that adds to the pleasure of automobiling is a device for indicating how much gasoline there is in the tank, so that it is not necessary to unscrew the filling cap and perhaps introduce a stick—a process that may cause the introduction of dirt as well into the gasoline system. The Triumph gasoline gauge, manufactured by the Boston



TRIUMPH GASOLINE GAUGE.

Auto Gage Co., 613 Old South Building, Boston, has a magnetically operated indicating needle on a dial, the instrument being inserted permanently through the filling hole or in a special opening cut in the top of the tank. The manufacturers of this instrument state that the George N. Pierce Co. has adopted it as part of the equipment of its Arrow cars.

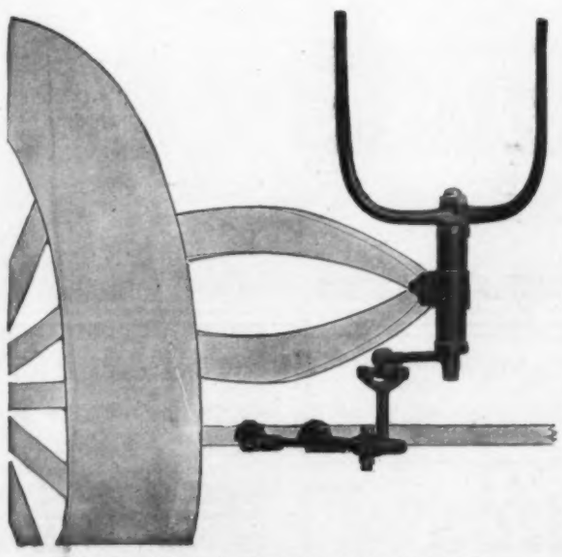
ELECTRIC HORN.—The necessity for sounding the ordinary automobile horn is sometimes a nuisance, especially in heavy traffic, where both hands are required for steering and braking, and a number of inventors have bent their energies toward the production of something that would simplify the sounding of the horn to the last degree. One of the latest devices is the O'Brien "Electrophone," a horn with an electric vibrator in place of the usual reed, the vibrator being operated by a magnet. It is manufactured by the O'Brien Electrophone Co., Augusta, Me. A battery of six dry cells furnishes the necessary current, and the push button for sounding the horn may be placed on the rim of the steering wheel or in any convenient place. The horn is made either straight or coiled, and with single or double tone.

SELF-CLEANING PLUG.—One of the principal claims made for the Excelsior spark plug is that it is self cleaning. The cleaning may be done while the motor is running, if it has more than one cylinder, and, in fact, is best done under these conditions. The cleaning feature consists of small holes leading from the upper extremity of the chamber in the shell of the plug to a point where they would open into the atmosphere were they not covered by a nut. If the plug becomes fouled and the engine misses explosions, the nut is slacked back, opening communication between the inside of the cylinder and the atmosphere through the holes, and the violent rushing back and forth of the air as the piston rises and falls scours away the deposit and starts the plug working again. The faster the engine is running the more violent the rush of air and the quicker and more thorough the cleaning. This, of course, refers to a multiple cylinder engine, in which it is only necessary to turn back the nut for a moment, without removing the plug or stopping the engine, to restore normal conditions. In a single cylinder engine a few turns of the crank by hand will do the work. The plug is insulated with natural stone. The peculiar form of the central electrode permits oil to run down away from the sparking points.

NEW MUFFLER.—A new muffler has recently been brought out by the Champion Mfg. Co., 15 Alling street, Newark, N. J., which is said to be unusually effective in silencing and free from back pressure. It is cylindrical and the gases enter by a pipe in the center of one of the heads. The inlet pipe is continued inside the muffler in the form of a closely coiled spring which extends only half way through the muffler and is closed at the inner end. The shell of the muffler is divided into two parts by a perforated plate midway of its length. The second compartment contains a perforated tube the outer end of which opens into the air. The gases from the engine pass into the spiral spring first, and by their own pressure open the convolutions slightly, thus forming an extremely long and very narrow slit—the space between the coils—through which the gases escape freely, but well broken up. After expanding in the chamber surrounding the spiral, the gases pass through the perforated partition, expand further in the second chamber, and finally escape through the perforated tube to the atmosphere. The manufacturers state that the openings are all of an area equal, in the aggregate, to that of the exhaust pipe, so that there is no choking. The muffler is light and of small size. It gives the best results when placed about three feet from the engine.

MECHANICALLY OPERATED MUFFLER.—A muffler constructed on a new principle has been constructed and a patent applied for by L. T. Weiss, 286 Graham street, Brooklyn, N. Y. This muffler has only a single expansion chamber having a cubic capacity equal to about five times the cubic capacity of one cylinder of the motor with which it is connected. The gases are piped direct to this chamber and escape to the atmosphere through an opening controlled by a mechanically operated valve. This valve is so timed that it is always closed when an exhaust valve on the engine is opening, so that the first rush of the exhaust is caught in the closed expansion chamber. The muffler valve opens as soon as this first rush of gas is over, and remains open while the piston is pushing the gases out of the cylinder. The muffler is built on the theory that the "bark" of the exhaust is produced by the first escape of gas at high pressure. This being deadened in a completely closed muffler, the remainder of the exhaust takes place with but little sound. The area of the opening through which the gases make their escape from the muffler is about twice as great as that of the exhaust valve of the motor, so that back pressure is avoided. Mr. Weiss states that a number of automobilists who have used the device express the highest opinion of its efficiency.

NEW LAMP BRACKET.—When driving an automobile at night with no light except that of the fixed head and side lights on the machine, it is often found that curves and corners must be taken at greatly reduced speed because the lamps, being immovably attached to the body of the car, do not illuminate the road on the curve ahead. The Imperial Brass Mfg. Co., 247 South Jefferson street, Chicago, has brought out a new bracket for such searchlights which causes the lamp to turn with the steering wheels, so as to illuminate the road always in the direction the wheels are pointed. The forked bracket that holds the lamp is mounted to swing on a pivot; to the lower end of the pivot, which projects downward a few inches, is attached a crank connected by jointed rods with the rod extending from one steering knuckle to the other. Thus, when the front wheels turn the lamps follow at the same angle.



IMPERIAL-LYON AUTOMATIC LAMP ADJUSTER.

CONVENIENT SPARK PLUG.—Until the gasoline engine is developed to a point where it will never soot the plugs, or until a plug is produced that will never soot, break or otherwise "cease firing," plugs must be removed from the cylinders at intervals, and the removal of a plug from a close corner in a sizzling hot engine is not always an

THE BREECH-BLOCK PLUG.

agreeable task. The production of a plug that can be removed and replaced with the least expenditure of time and trouble was the object of Earl Candey, of 1001 West avenue, Chicago Heights, Ill., who has devised the "breech-block" plug, having an interrupted thread, from which it derives its name. The base of the plug screws into the cylinder in the usual way, and remains there; but by giving one-sixth of a turn to the handle that is permanently attached to the plug, the upper part, with the insulation, sparking points and packing gaskets, can be removed at once. The porcelain is hand turned and highly glazed; it does not touch the shell of the plug at all, but the ends are held by asbestos and copper gaskets, so that when the holding nut is loosened all the parts are free. The sparking points are adjustable. The metal parts of the plug are nickeled and polished inside as well as outside, to prevent the adherence of soot.

TRADE PUBLICATIONS RECEIVED.

F. A. GOEBEL, Marietta, Ohio—Pamphlet illustrating and describing the Snapit lock switch for automobile ignition circuits.

REO MOTOR CAR CO., 138 West 38th street, New York.—Humorous booklet, entitled "Jolts," reciting the experiences of an automobilist whose car was not a Reo.

NATIONAL BATTERY CO., Buffalo—Circulars illustrating and describing National storage batteries for automobile ignition work and also for use in electric automobiles.

CHARTER MFG. CO., 59 Clark street, Chicago.—Circular regarding force feed lubrication devices for gasoline motors, and illustrating some forms and their application to cars.

THE BARTHOLOMEW CO., Peoria, Ill.—Advance circulars illustrating and describing the Glide automobiles for 1906—Model E, a four-cylinder 30-horsepower touring car, and Model F, a two-cylinder 18-horsepower light touring car.

HESS-BRIGHT MFG. CO., 245 North Broad street, Philadelphia.—Circular illustrating and describing a new ball bearing, of the type manufactured by this concern, intended for use on the steering pivots of automobiles to take the thrust.

WHEELER MFG. CO., Detroit, Mich.—Circulars regarding Rand canopy, cape and extension tops for automobiles; also drawing, showing how to measure for tops of any kind, so that these can be made to order without being actually fitted to the car.

LOCOMOBILE CO. OF AMERICA, Bridgeport, Conn.—Booklet containing preliminary specifications of the 1906 Locomobile cars—Type E, 15-20-horsepower; and type H, 30-35-horsepower, together with illustrations of complete cars and a number of details.

PHOENIX AUTO SUPPLY CO., 3939 Olive street, St. Louis, Mo.—Supplement to general catalogue. Contains illustrations, descriptions and prices of carbureters, ignition apparatus, pumps, horns, springs, jacks, tops and other automobile accessories.

ILLINOIS CENTRAL RAILROAD, 1 Park Row, Chicago.—Book of 220 pages giving locations for industries along the lines of the Illinois Central and the Yazoo & Mississippi Valley railroads, including descriptions of towns and facilities for manufacturing purposes.

CHICAGO & NORTHWESTERN RAILWAY, George Bonnell, Industrial Agent, 215 Jackson Boulevard, Chicago.—Pamphlet giving information regarding opportunities for the establishment of manufacturing plants on the line of the Chicago & Northwestern Railway, and map of the line. A list of a number of factory buildings available for immediate occupancy is given.

DUFF MFG. CO., Pittsburg, Pa.—Pamphlet entitled "Frenzied Jack Sense," containing some humorous rhymes regarding the jacks, for automobile and other work, manufactured by this concern.

GOOD ROADS DEPT., BARRETT MFG. CO., New York City.—Illustrated pamphlet describing the advantages of tar for keeping down dust and preventing the formation of mud on roads. For this work Barrett's road tar is especially prepared and its advantages are described in the pamphlet.

MISSOURI STATE BOARD OF AGRICULTURE, George. B. Ellis, secretary, Columbia, Mo.—Pamphlet illustrating and describing road improvement methods, giving interesting and valuable information on the subject of the maintenance of country roads, particularly by the King log-drag method.

H. H. FRANKLIN MFG. CO., Syracuse, N. Y.—Booklet on "Other Peoples' Experience," a collection of letters from persons who use and like the Franklin cars. Especially interesting are letters from automobilists who are still driving Franklins of the earlier models. Also the "Franklin News for 1906," containing illustrations and remarks on the several Franklin models.

HERMAN BOKER & CO., 101 Duane street, New York City.—A pamphlet describing their Meteor wire as a substitute for platinum, and claiming equal durability with less corrosion. This Meteor wire is used for sparking points in automobiles, gas and gasoline engines, and other places where non-corrosive contact points that will not disintegrate under high heats are required.

GASOLINE HANDLING OUTFITS.—A catalogue describing a large number of outfits for handling, storing, measuring and transferring gasoline has been issued by the Western Oil Pump Co., 2437 Kosciusko street, St. Louis, Mo. The advantages of underground storage of gasoline and oil, combined with automatic measurement by an indoor pump are well known to those who use gasoline in large quantities; and even the automobilist whose demands for gasoline are comparatively small frequently finds it exceedingly convenient to have such an outfit, on a small scale, installed for his private garage. The outfits described in the Western Oil Pump Co.'s catalogue cover the requirements of all users of gasoline and oil, and the mechanical details of the appliances used are worked out in an ingenious and substantial manner.

INDEX TO ADVERTISERS

A

Acetylene Gas Illuminating Co. 38
Adrian Steel Casting Co. 42
Adwear Tire Sleeve Works 38
Am. Anti-Puncture Tire & Auto Co. 52
American Ball Bearing Co. 54
American Coil Co. 37
American Darracq Automobile Co. 84
American Machine Mfg. Co. 39
American Veneer Co. 55
Anderson & Sons Co. 42
Atwood Mfg. Co. 38
Auto Brass & Aluminum Co. 42
Auto Rebuilding Co. 44
Auto Top Mfg. Co. 44
Automobile Equipment Co. 43
Automobile Supply Co. 41
A-Z Co., The 42

B

Badger Brass Mfg. Co. 50
Baker Motor Vehicle Co. 80
Baldwin Chain Mfg. Co. 42
Bay State Stamping Co. 37
Bemus, T. Alton 54
Biederman, C. 57
Bliss-Chester Co. 38
Blomstrom Motor Co., C. H. 91
Boker & Co., H. 39
Boston Auto Gauge Co. 66
Boston Automobile Exchange 33
Boston Cycle & Sundry Co. 38
Bowser & Co., S. F. 39
Brennan Motor Co. 53
Briscoe Mfg. Co. 38
Brown Mfg. Co., J. C. 39
Buckeye Jack Mfg. Co. 59
Buckeye Mfg. Co. 76
Buckeye Wheel Co. 68
Bullock Igniter Co. 37
Burgin Bros. 39
Byrne-Kingston Co. 65

C

Cadillac Automobile Co. 79
Camp Cycle Co. 53
Canedy, Earl 41
Carbondale Chemical Co. 39
Carr, F. S. 50
Central Body Co. 44
Champion Co., Albert 41
Champion Mfg. Co. 55
Chandlee & Chandlee 56
Chelsea Clock Co. 37
Cleveland Oil Soap Co. 49
Cleveland-Canton Spring Co. 53
Collins & Sons, G. A. 44
Connecticut Tel. and Electric Co. 37
Continental Caoutchouc Co. 73
Continental Motor Mfg. Co. 45
Corbin Motor Vehicle Corporation 82
Corwin Mfg. Co. ..... Cover
Covert Mfg. Co. 42
Crawford Automobile Co. 76
Crucible Steel Casting Co. 42
Cullman Wheel Co. 42

D

Daimler Mfg. Co. 84
Davis Mfg. Co. 67
Dayton Electrical Mfg. Co. 51
Diamond Chain & Mfg. Co. 38
Diamond Rubber Co. 72
Dietz, R. E. 61
Dixon Crucible Co., Joseph 56
Dow Portable Electric Co. 41
Draper Bros. Co. 37
Dyke Auto Supply Co., A. L. 41

E

E. H. V. Co., The 82
Eclipse Buggy Co. 44
Edmunds & Jones Mfg. Co. 43
Elbridge Electric Mfg. Co. 60
Eldredge Electric Mfg. Co. 37
Electric Storage Battery Co. 53
Electric Vehicle Co. 77
Elmore Mfg. Co. 77
Erie Railroad 44
Erie Stamping & Mfg. Co. 58
Excelsior Supply Co. 37

F

Fairmount Engineering Works 37
Fast, Otto 46